DOUWE EGBERTS

HV2 Coffee dispenser

Service Manual

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A SaraLee Company

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1. SPECIFICATIONS

Dimensions: Height: 35"
Width: 31"
Depth: 20-5/8"

The above dimensions are dispenser dimensions only. Allow 4" additional clearance for ventilation on the right, left and rear sides. Refer to Drawings 1 and 2 on the following pages for suitable dispenser placement and connections.

Weight: 180 lbs. dry
325 lbs. with water tank filled

Internal Water Tank: 18 gallons/68 liters
Non-pressurized (vented to atmosphere)

Heating Capacity: 15,000 Watts @ 208 volts

Electrical Connection: Direct connection to internal terminal block
3 phase—208 volts AC (with 120 volts from L1, L2 and L3 to neutral)
5 wire (L1, L2, L3, neutral and ground)
44.4 amps/phase @ 208 volts

Water Connection: 1/2" supply line to within 4” of the dispenser
Required operating pressure from 20 psi to 85 psi
A non-restrictive manual shut-off valve and a good water filter should be installed in the water line close to the dispenser.
Allow sufficient space in the final connection for the required backflow preventer.
Final connection can be made with 3/8" copper tubing, as long as a water flow rate of at least 5 gallons/minute is provided.
Hot water (< 190°F) is preferable as this will provide the fastest recovery.

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ALL WIRING, CIRCUIT PROTECTION, AND PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH LOCAL CODES AND REGULATIONS

2. INSTALLATION

Refer to Drawings 1 and 2 for dimensional and utility placement information.

2.0 LOCATION

When installed and operating, the dispenser has a total weight of approximately 325 lbs. A sturdy table or counter must be used - preferably stainless steel with a drain across the front - which will offer the optimum support and sanitary conditions.

The outlet spout should extend over the front of the counter so that the offset pipe adapter can hang down when filling large containers.

Leave at least 4" of space on all sides of the dispenser - particularly the back and right hand sides - for ventilation.

The electrical connection and water connection enter the dispenser through the bottom.
(See Drawing 1 for dispenser footprint and utility connections.)

2.1 UNPACKING AND PREPARATION

Depending on the method of transportation, in most cases the dispenser will arrive boxed and strapped to a pallet. Carefully remove the packing. Avoid cutting through the top areas of the cardboard to eliminate the risk of scratching the cabinet. The bottom 4" of the carton surround only the legs and can be safely cut.

Place the dispenser on the counter top in the general area of the final location. Position the dispenser as outlined in Drawing 1, paying particular attention to the ventilation clearances and front overhang.

It is very important that the dispenser is level when put into operation. This allows the internal water tank level to be exact and results in proper main door clearances.

Level the dispenser by screwing the ends of the legs in or out until the machine is setting level and sol id. The clearance along the top and left edges of the main door should be parallel to the adjacent surfaces. (*See Drawing 3.)* If there is any run-out along these two edges, the dispenser is NOT level.

Two main door keys are packed with the dispenser. Unlock and open the main door of the dispenser. Open the cooling compartment door. inside the compartment will be the following items:

- Coffee draw off assembly
- Offset pipe adapter
- Backflow preventer/water inlet assembly (where applicable)

Remove and unpack these items. Install the coffee draw off assembly by removing the knurled screws from each side on the underside of the cooling compartment. *(See Drawing 4.)* Fit the straight ends of the draw off assembly through the cut out area of the lower splash panel, and onto the two white draw off inlets which are visible toward the rear of the dispenser when looking through the cut out area of the lower splash panel. Lift the draw off assembly slotted bracket up against the bottom of the cooling compartment and install the two knurled screws through the slots in the bracket. Push the draw off assembly back as far as it will go and tighten the two knurled screws.

Remove the left front cabinet panel by removing the two hex headed bolts under the front edge of the panel. *(See Drawing 4, Detail A.)* Pull the bottom of the panel away from the cabinet and allow it to drop, allowing the top edge to come free.

The float switch assembly is located on the top surface of the water tank. Verify that the float wire is hooked over the arm of the float switch, the float switch arm is down, and the float wire is free to move up and down. *(See Drawing 4, Detail B.)*

Two thermostats are located at the upper left comer on the front of the water tank. *(See Drawing 4, Detail C.)* Verify that both thermostats are tuned off (fully counterclockwise).

2.2 WATER CONNECTION

CONNECTION OF WATER MUST BE MADE USING MATERIALS AND METHODS IN ACCORDANCE WITH LOCAL CODES AND REGULATIONS. IF YOU ARE UNFAMILIAR WITH THESE REQUIREMENTS, ALLOW THIS CONNECTION TO BE MADE BY A QUALIFIED PLUMBER.

A backflow preventer assembly will be required for most installations. This prevents water from the dispenser being allowed to flow back into the water source. *(Refer to Drawing SA.)*

A 1/2" pipe with a non-restrictive shut off valve should be plumbed to within 4” of the dispenser location.

Hot water (< 190°F) is recommended to provide the quickest recovery rate. Cold water can, of course, be used. The customer’s requirements and expectations are most often the deciding factor.

The water source should be capable of a flow rate of between 5 to 6 gallons per minute. A flowing pressure of more than 20 psi is required. Pressure should not exceed 85 psi when not flowing

If water quality is unknown, a suitable water filter with proper flow ratings is strongly recommended.

The final connection from the source to the backflow preventer can be made with 3/8" copper tubing. Plastic hose is NOT recommended. The outlet fitting of the backflow preventer should attach directly to the inlet valve on the bottom of the dispenser.

Turn on the water and check for leaks.

The incoming water, being controlled by the electrically operated inlet valve, should not begin to flow at this point. Water flowing into the tank, without the power being connected, indicates that debris has been allowed to enter the inlet valve.

2.3 ELECTRICAL CONNECTION

ELECTRICAL CONNECTION MUST BE MADE USING MATERIALS AND METHODS IN ACCORDANCE WITH LOCAL CODES AND REGULATIONS. IF YOU ARE UNFAMILIAR WITH THESE REQUIREMENTS, ALLOW THIS CONNECTION TO BE MADE BY A QUALIFIED ELECTRICIAN.

60 amp, 3 phase, 5 wire service is required by way of a fused disconnect or circuit breaker. preferably located approximately 4'from the dispenser.

With the left front panel removed, the terminal block can be found mounted to the base of the dispenser at the front left comer. (See Drawing SB.)

An entrance hole is provided for the electrical wiring but may have to be enlarged depending on the materials used. No conduit flitting is provided due to the many variations and sizes. The necessary approved fitting must be sourced and fitted by the installer.

A minimum of #6 copper wire must be used for the final connection. The wire must be contained within a liquid tight conduit.

The final connection to the dispenser is shown in Drawing SB.

DO NOT turn on the power until reading the start up procedure which follows.

IMPORTANT! NEVER. AT ANY TIME DEFEAT. BYPASS, OR OTHERVVISE DISABLE THE FUNCTION OF THE HIGH TEMPERATURE LIMITER OR ANY OTHER SAFETY DEVICE, FUSE OR SAFETY CONTROL SYSTEM. SERIOUS INJURY, FIRE, OR DAMAGE TO THE DISPENSER MAY RESULT.

2.4 START UP PROCEDURE

- Remove the protective plastic film from the stainless steel cabinet panels.
- Verify the correct position of the float wire, and float switch. (See Drawing 4.)
- Verify that both thermostats and the overnight switch are switched off. (See Drawing 4.)
- Turn on the main power (breaker or disconnect).
- The refrigeration compressor should start and in a few moments the rear surface of the cooling compartment will start to feel cold. The refrigeration system runs quietly and the starting of the compressor may not be heard. The refrigeration system automatically maintains the correct product storage temperature in the cooling compartment, and in so doing will cycle on and off - even when the overnight switch is switched off.
- Check the incoming line voltage. Refer to Drawing 6 and compare your readings with the values shown in Detail B.

  Do not continue if your measured readings show any significant differences from the values shown. If you are uncertain, consult with an individual familiar with the electrical service at the installation site.

IMPORTANT
To provide maximum performance and reliable operation the electrical source and final connections must be correct. If, for any reason, the electrical power is turned off while the refrigeration is running, it will be necessary to allow approximately 5 minutes for the pressures in the refrigeration system to settle before restarting the dispenser. This is the same procedure as any other conventional refrigeration system.

- Turn on the overnight switch (Drawing 6, Detail A). You should hear the water inlet valve open and allow water to start entering the tank.

- On the operating panel (Drawing 7) the “Power” lamp (Detail A) will come on. At this point do not be concerned about the status of the two “Ready” lights (Detail B and C). it should take approximately 3-I/2 minutes to fill the tank. When the tank is full, you will see the float switch lever rise (Drawing 6, Detail C) and hear that the water flow has stopped.

IMPORTANT
If it takes longer than 4 minutes 20 seconds to fill, the incoming water source will NOT keep up with the dispenser. The result will be pots of coffee with uneven fill levels and beverage strength.

2.5 TEMPERATURE ADJUSTMENTS

There are two thermostats located at the upper left front comer of the tank. Refer to Drawing 6, Detail D.

- Turn the upper (lockout) thermostat to the 80 position. These thermostats are calibrated in Degrees Centigrade. 80°C is equivalent to 176°F.

- Turn the lower (tank temp) thermostat to the 90 position (195°F). You should see and hear the two main heating contactors located on the control chassis pull in.

- Test the high temperature limiter (Drawing 6, Detail E) by pulling outward on the green button. Each time the button is pulled out, both contactors should drop out. When the button is released. the contactors will pull back in.

IMPORTANT!
NEVER AT ANY TIME DEFEAT. BYPASS. OR OTHERWISE DISABLE THE FUNCTION OF THE HIGH TEMPERATURE LIMITER OR ANY OTHER SAFETY DEVICE, FUSE OR SAFETY CONTROL SYSTEM. SERIOUS INJURY, FIRE, OR DAMAGE TO THE DISPENSER MAY RESULT.

Heating time for a given water heating system is largely a factor of incoming water temperature. Referring to Chart C1, an incoming water temperature of 100°F will result in an initial heating time of approximately 18 minutes. Colder water will lengthen the heating time and hotter water will shorten the amount of time it takes to heat.

2.6 EMPTY (SOLD OUT) AND DISPENSE TEMPERATURE INDICATORS

Observe the two “Ready” indicators on the front panel *(Drawing 7, Details B and C)*. Both indicators should be illuminated and red, indicating that both coffee concentrate product packages are empty or in this case not present.

If a small piece of paper towel is inserted to a depth of about 1” into each of the concentrate dispense coils (located in the bottom of the cooling compartment), the empty sensing circuit will be blocked and the red indicators will go out. Refer to Drawing 7, the cut away view of the cooling compartment door.

For reference, the “Small” indicator (Detail B) indicates an empty condition for the left product container and the “Large” indicator (Detail C) indicates an empty condition for the right product container.

These same two indicators have another function. When the lockout thermostat was adjusted to 80 (176°F) in the previous Temperature Adjustments Section, it will, through the electronics of the dispenser, prevent the dispenser from dispensing coffee until the water tank temperature is above approximately 176°F.

When the tank temperature reaches this preset temperature, one of the two indicators will turn green. The position of the select switch *(Drawing 7, Detail D)* determines which one of the two indicators will turn green. This will also tell the customer at a glance which size (small or large) will dispense when the start switch *(Drawing 7, Detail F)* is activated. Switching the select switch to the other position illuminates the other indicator.
Additionally, if neither indicator is green, and the “Power” lamp is illuminated, the customer will be aware that the dispenser will need time to re-heat the water tank before another dispense cycle can be started.

The lockout thermostat can be adjusted to any minimum dispense temperature desired. It is dependent on the customer’s preference. Remember that a hot water source to the dispenser is preferable. By using a hot water source to the dispenser, the water may never get too cold. The customer would never be inconvenienced waiting for the dispenser to heat.

The lockout temperature has **nothing** to do with the **maximum** water temperature, which is determined by the tank temp thermostat.

If the lockout feature is not desired by the customer, the lockout thermostat can be turned completely off (fully counterclockwise) and the dispenser will dispense coffee regardless of how cold the water gets.

If the lockout is inadvertently tuned too high (higher than the maximum temperature determined by the tank temp thermostat) the dispenser will never be allowed to dispense because the water temperature will never get as hot as the setting of the lockout thermostat.

The tank temp thermostat can be adjusted from its initial setting of 90 (195°F) if a different drink temperature is desired by the customer.

Important

The MAXIMUM tank temperature should not be adjusted higher than 200°F. This will cause excessive condensation to drip from the condensation drain (Refer to Drawings 1 and 2 for the location of the condensation outlet).

The MINIMUM tank temperature should not be adjusted lower than 170°F. This will not cause any malfunction of the dispenser but may result in the improper mixing of the finished product.

2.7 STANDARD DISPENSE SETTINGS

This dispenser has been pre-set to specific delivery volumes and settings as outlined below.

SETTINGS AS DELIVERED:

Water Flow Rate	98 cc/sec (per package side)
Dispense Rate—Small*	Approx. 1.6 gpm + concentrate
Dispense Rate—Large*	Approx. 3.3 gpm + concentrate
Stop Button Function	Selected/Enabled
Large Mode**	“High Volume ‘
Strength Ratio Large	36:1
Large Dispense Size	3700 cc
Large Dosing Mode	Continuous Flow
Large Size Product Type	Coffee
Small Mode***	“Not High Volume”
Strength Ratio—Small (1 Pkg.)	36 : 1
Small Dispense Size	1830 cc
Small Dosing Mode	Continuous Flow
Small Size Product Type	Coffee
Pause Between Servings	Disabled
Electronic Counter Display	Off

*** FINAL DISPENSE PATE (SPEED) IS PARTILY DEPENDENT ON RATIO.**

**** WILL OPEPATE BOTH SIDES SIMULTANEOUSLY. THE “HIGH VOLUME” SETTING FLOW RATE IS TWICE THAT OF THE “NOT HIGH VOLUME” SETTING (OR 98 CC/SEC + 98 CC/SEC IN “HIGH VOLUME” MODE). “AUTOMATIC RATE COMPENSATION” FOR ONE EMPTY PACKAGE IS ENABLED. DISPENSER CIRCUITRY WILL AUTOMATICALLY ADJUST THE DISPENSE TIME IN ORDER TO GIVE THE CORRECT VOLUME IF ONE PACKAGE BECOMES EMPTY—AND WILL AUTOMATICALLY SELECTTHE FULL PACKAGE.**

***** OPERATES ONE SIDE (PACKAGE) ONLY FOR SMOOTHER DISPENSE ON SMALLER PORTION SIZES (FLOW RATE IS 98 CC/SEC). AUTOMATICALLY SELECTS FULL PACKAGE IF ONE PACKAGE IS EMPTY.**

THIS TYPE OF SET UP IS INTENDED FOR OPERATION WITH ONE TYPE OF PRODUCT (2 PACKAGES OF REGULAR COFFEE Vs ONE REGULAR AND ONE DECAF) IN A HIGH USAGE ENVIRONMENT WHERE AN ADDITIONAL DISPENSER IS USED FOR DECAF COFFEE.

In the event that the end user needs to have these settings changed, refer to the HV2 service manual, “Programming the Dispenser” for a listing of programmable settings. This adjustment should only be performed by a factory trained and properly equipped service person.

2.8 COFFEE DISPENSE FUNCTIONS AND OPERATING CONTROLS

Refer to Drawing 7.

OVERNIGHT SWITCH

It is suggested to turn the overnight switch to the “OFF” position during periods of extended non-use, i.e., at night and between coffee serving times.

It will be necessary to allow a few minutes for the dispenser to heat to serving temperature after turning the switch to the “ON” position.

The purpose of the overnight switch is to provide energy savings and prevent the unauthorized use of the dispenser, as it is necessary to have a key to open the main door of the dispenser and access the overnight switch.

It also provides a safety feature in that no accidental dispense or heating cycles could begin (in the event of a dispenser failure) without someone in attendance. The overnight switch will turn off all coffee dispense, water inlet and heating functions. It does **not** shut off the refrigeration system, which needs to operate automatically to maintain the correct product temperature.

POWER ON INDICATOR (DETAIL A)

The Power On indicator is only an indication to the end user if the overnight switch is “On”. it is not an indication of temperature or dispense readiness.

SMALL READY / LARGE READY / SELECT SWITCH (DETAILS B, C AND D)

The small and large ready indicators tell the end user the status of the dispense temperature and the presence of empty product packages in the cooling compartment.

In normal operation if the select switch (Detail D) is set to the “Small” (left) position; the Small ready indicator should be green.

In the “Large” (right) position, the large ready indicator should be green. If it is not illuminated, the water temperature is too cold (below the minimum dispense temperature set by the lock out thermostat). The dispenser will need to re-heat at which point the indicator will turn green.

GREEN = GO—all systems are correct for this portion size.
If the indicator is yellow, it is indicating that a product container in the cooling compartment is either empty or missing, but the dispense temperature is correct. and the dispenser will use the remaining product package to continue dispensing.

YELLOW = CAUTION—temperature is OK, but product is low.
If the indicator color is Red, the package is empty, and the dispenser has not heated to the correct dispense temperature.

RED = STOP—check product packages and allow dispenser to re-heat.

For the end user, GREEN = GO, YELLOW = CAUTION. RED = STOP are easy ways to remember dispenser status. However, for the service person, it may be beneficial to be aware of other combinations.

In the Appendices of this manual, a chart (C3) can be found to illustrate some of the various combinations of indicators and the respective dispenser condition. It is assumed that the overnight switch and power on lamp are both ON.

START SWITCH (DETAIL F)

With the select switch in the small position, depressing the start switch will start a complete dispense cycle for whatever volume has been programmed for the small size.

With the select switch in the large position, a large portion will be dispensed.

Changing the position of the select switch, after starting a dispense cycle, will not change the size of the portion being delivered.

STOP SWITCH (DETAIL E)

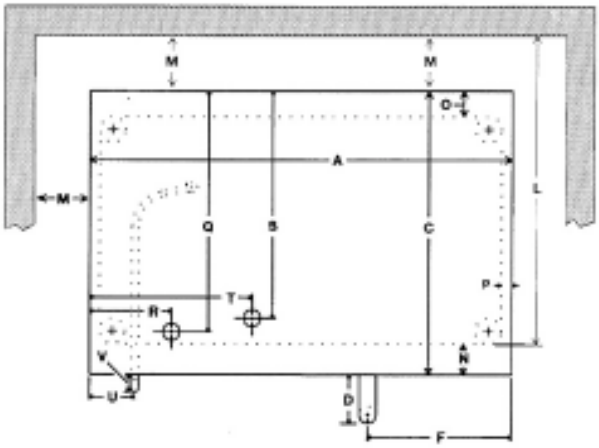
Stops a pre-set dispense portion in progress at any time during the cycle. The pre-portioned size will return to the beginning so that the next time the start switch is depressed a new, full cycle will start.

IMPORTANT
After pressing the stop switch, a volume of coffee and/or water will continue to dispense. This amount of coffee is unavoidable due to the flow rate and distance of travel inherent to the dispenser.

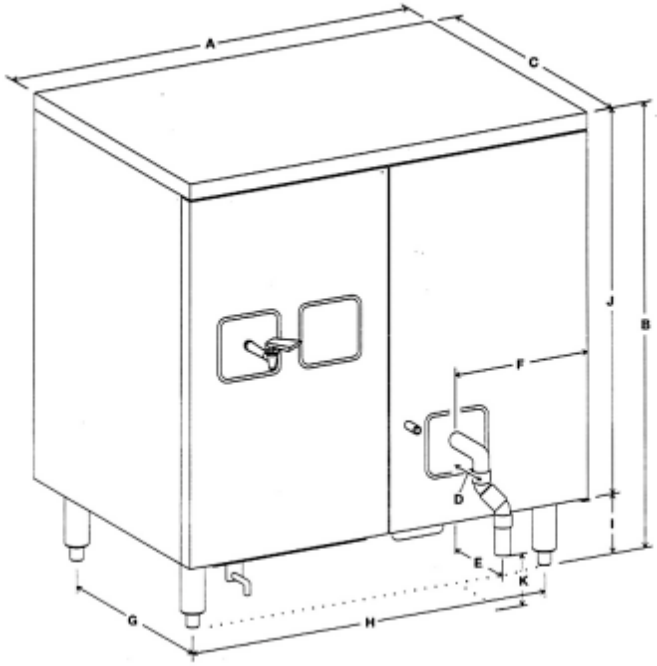
This “after-run’’ is part of the programmed dispense size and should be collected in whatever container is being used. It is not waste.

Remaining drips should drip into the drain tray of the counter surface as recommended in the Installation section.

DRAWING 1



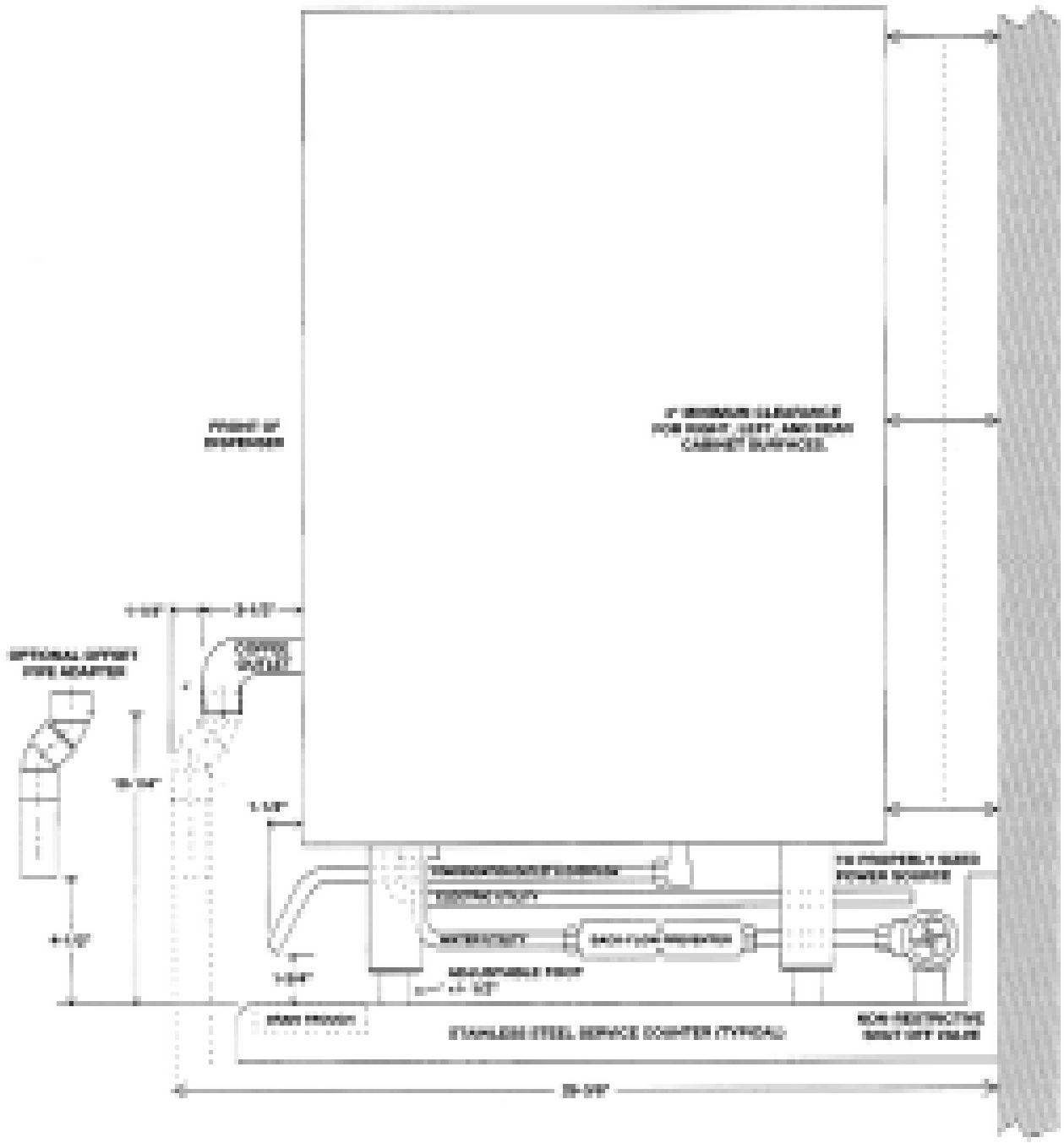
Dim.	Inches	Measurement of	Dim.	Inches	Measurement of
A	31	Overall Width	L	22-1/4	Minimum Counter Depth
B	35	Overall Height	M	4	Minimum Clearance
C	20-5/8	Depth	N	2-5/16	Leg inset (Front)
D	3-1/2	Coffee Outlet Overhang	O	1-7/8	Leg inset (Rear)
E	5	W/Adapter Overhang	P	3/4	Leg inset (Sides)
F	10-1/2	Side of Cabinet to Outlet	Q	17-1/2	Rear of Cabinet to Electric Conn.
G	16-7/16	Leg to Leg Depth	R	6	Side of Cabinet to Electric Conn.
H	29-1/2	Leg to Leg Width	S	16-1/2	Rear of Cabinet to Water Conn.
1	5-1/2	Leg Height	T	12	Side of Cabinet to Water Conn.
J	29	Door Height	U	3-3V8	Side of Cabinet to Cond. Drain
K	9-1/2	Coffee Outlet Clearance	V	1-1/4	Front of Cabinet to Cond. Drain



DRAWING 2

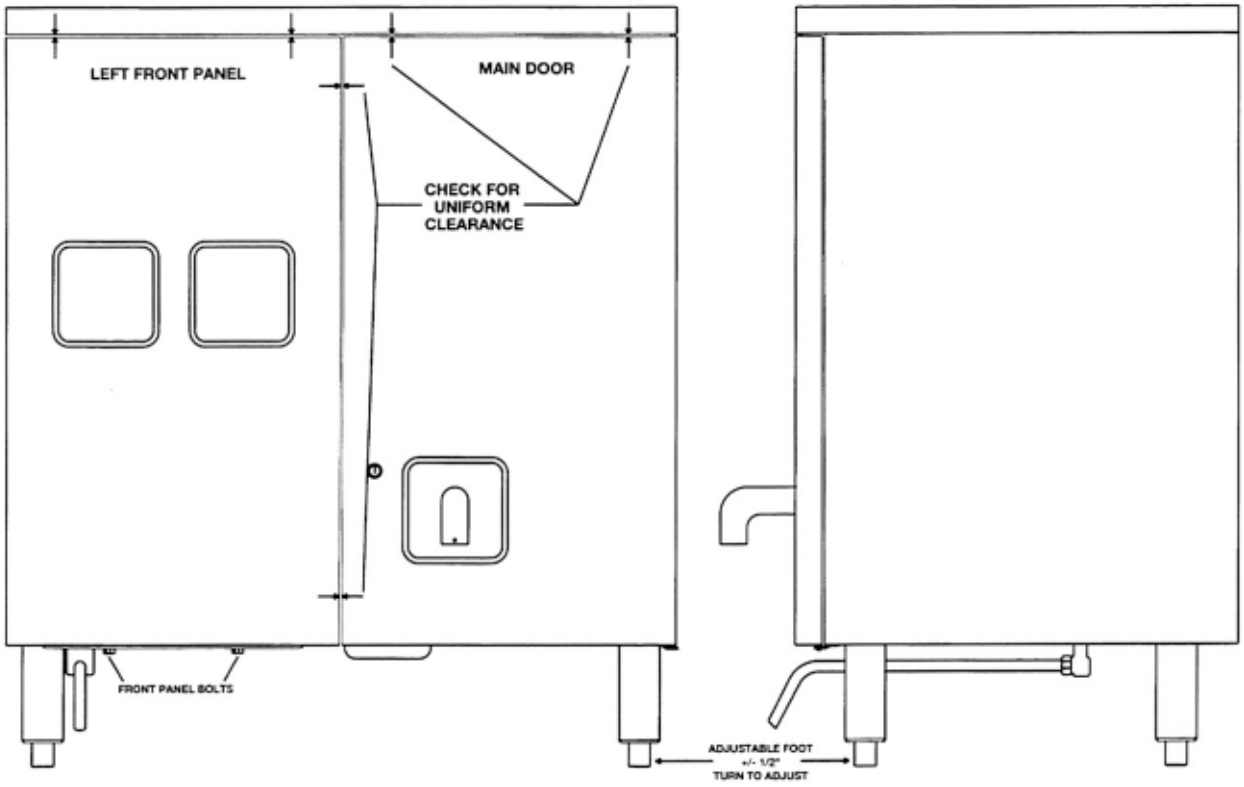
DISPENSER RIGHT SIDE

COUNTER-TOP PLACEMENT (DETAIL)



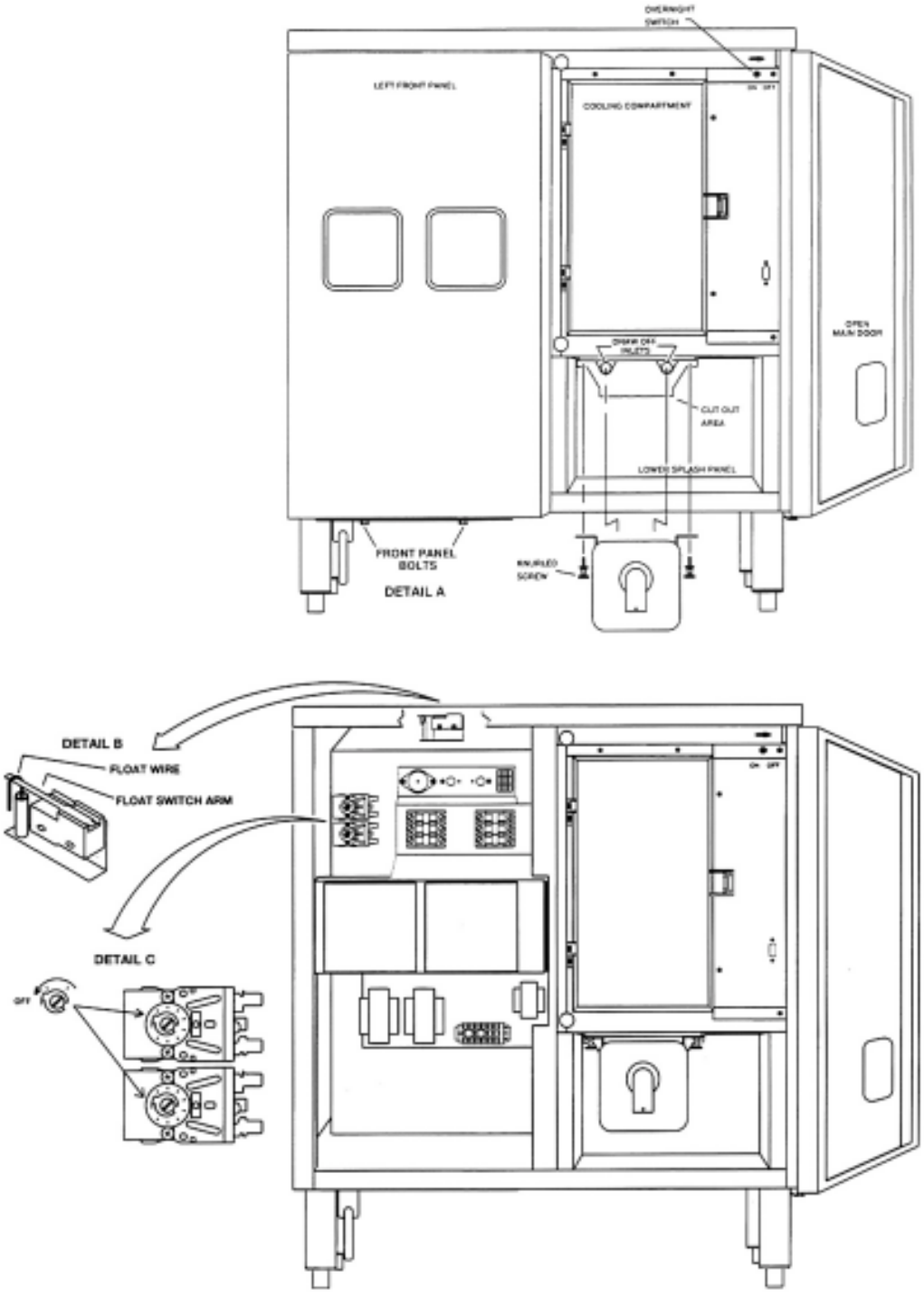
DRAWING 3

DISPENSER LEVELING, DOOR ALIGNMENT AND PANEL IDENTIFICATION

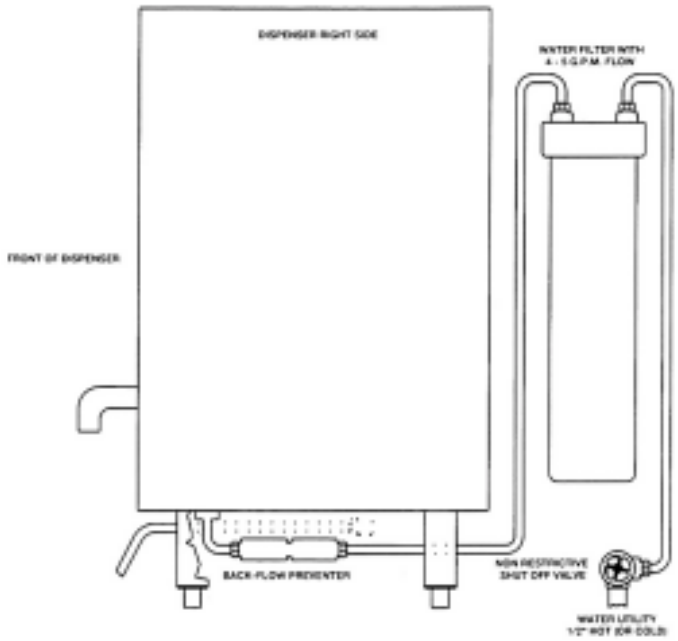


DRAWING 4

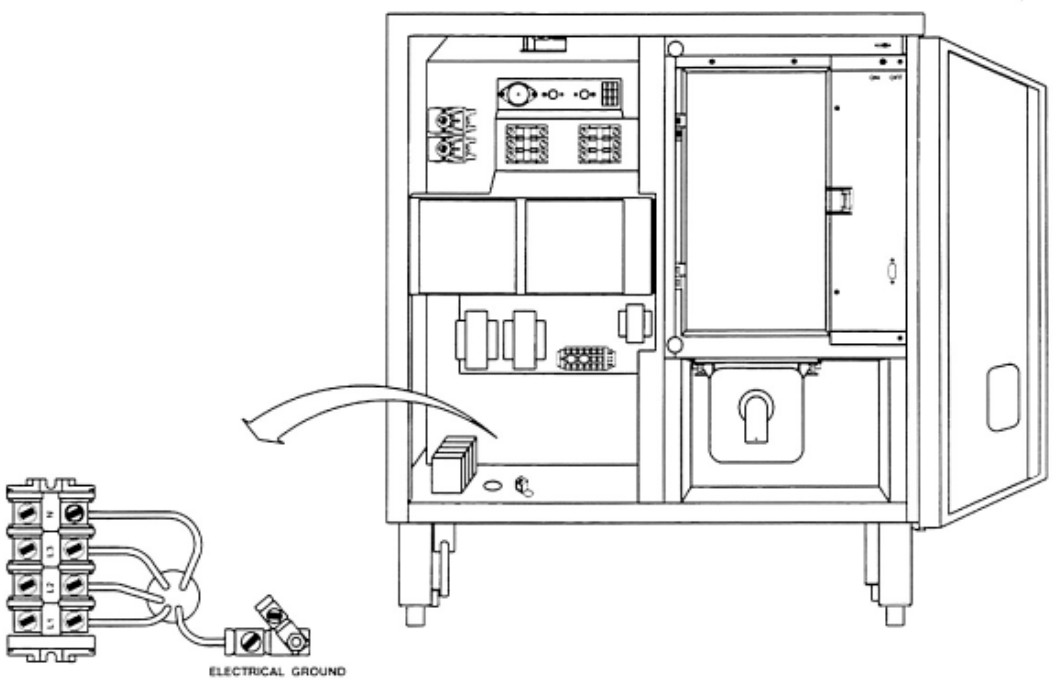
INSTALLING COFFEE DRAW OFF ASSEMBLY AND LOCATION OF FRONT PANEL BOLTS, FLOAT SWITCH AND THERMOSTATS



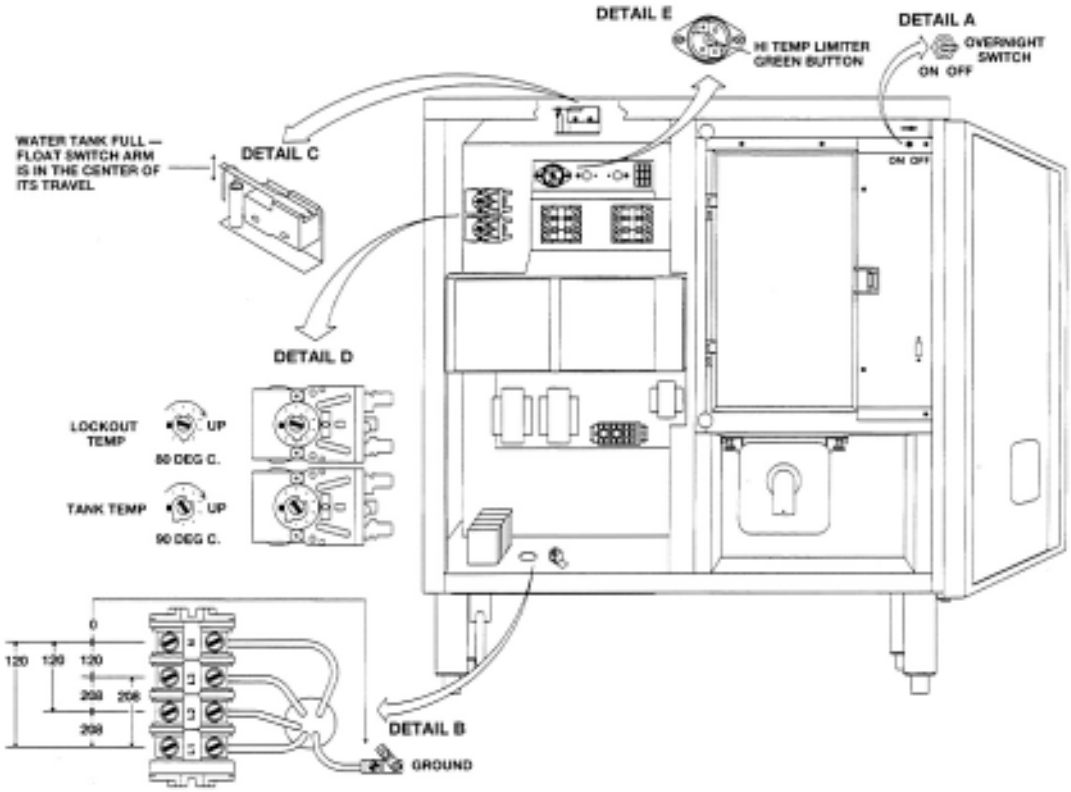
DRAWING 5A
WATER CONNECTION (DETAIL)



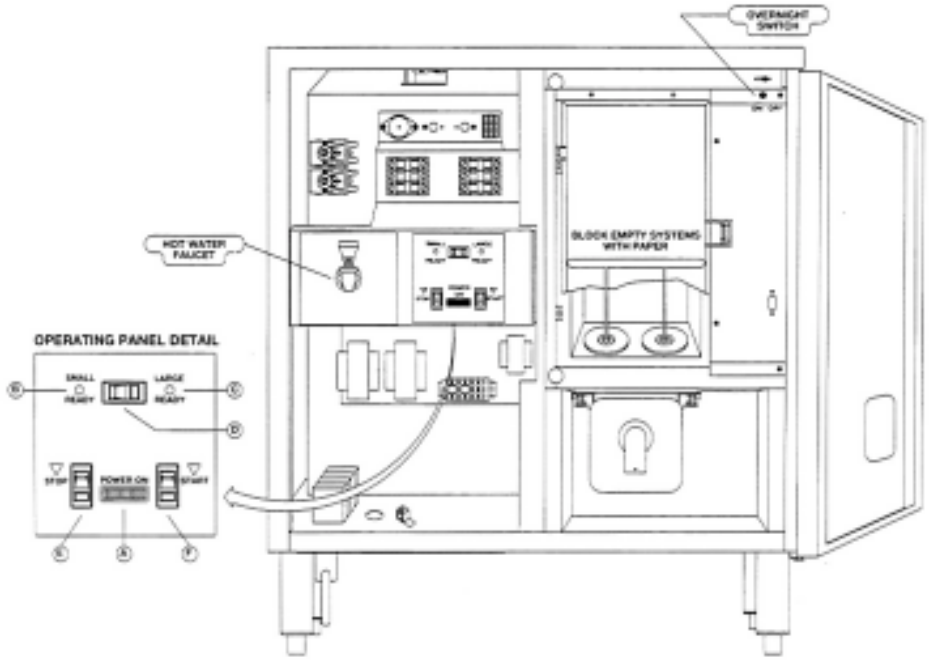
DRAWING 5B
ELECTRICAL CONNECTION (DETAIL)



DRAWING 6
START UP (DE



DRAWING 7
OPERATING CONTROLS



TEMPERATURE CONVERSION CHART - °C TO °F / °F TO °C

Read the actual temperature in the middle scale. To convert the temperature from °C to °F read to the *right*. To convert from °F to °C read to the *left.*

C<	T	>F	C<	T	>F	C<	T	>F	C<	T	>F
-40	-40	-40	-20	4	+24	+0	+32	+89	+20	+68	+154
-39	**-39**	**-38**	**-19**	**-3**	**+26**	**+0**	**+33**	**+91**	**+20**	**+69**	**+156**
-38	-38	-36	-18	-2	+28	+1	+34	+93	+21	+70	+158
-38	**-37**	**-34**	**-18**	**-1**	**+30**	**+1**	**+35**	**+95**	**+21**	**+71**	**+159**
-37	-36	-32	-17	0	+32	+2	+36	+96	+22	+72	+161
-37	**-35**	**-31**	**-17**	**+1**	**+33**	**+2**	**+37**	**+98**	**+22**	**+73**	**+163**
-36	-34	-30	-16	+2	+35	+3	+38	+100	+23	+74	+165
-36	**-33**	**-27**	**-16**	**+3**	**+37**	**+3**	**+39**	**+102**	**+23**	**+75**	**+167**
-36	-32	-25	-15	+4	+39	+4	+40	+104	+24	+76	+168
-35	**-31**	**-23**	**-15**	**+5**	**+41**	**+5**	**+41**	**+105**	**+25**	**+77**	**+170**
-34	-30	-22	-14	+6	+43	+5	+42	+107	+25	+78	+172
-33	**-29**	**-20**	**-13**	**+7**	**+44**	**+6**	**+43**	**+109**	**+26**	**+79**	**+174**
-33	-28	-18	-13	+8	+46	+6	+44	+111	+26	+80	+176
-32	**-27**	**-16**	**-12**	**+9**	**+48**	**+7**	**+45**	**+113**	**+27**	**+81**	**+177**
-32	-26	-14	-12	+10	+50	+7	+46	+114	+27	+82	+179
-31	**-25**	**-13**	**-11**	**+11**	**+51**	**+8**	**+47**	**+116**	**+28**	**+83**	**+181**
-31	-24	-11	-11	+12	+53	+8	+48	+118	+28	+84	+183
-30	**-23**	**-9**	**-10**	**+13**	**+55**	**+9**	**+49**	**+120**	**+29**	**+85**	**+185**
-30	-22	-7	-10	+14	+57	+10	+50	+122	+30	+86	+186
-29	**-21**	**-5**	**-9**	**+15**	**+59**	**+10**	**+51**	**+123**	**+30**	**+87**	**+188**
-28	-20	-4	-8	+16	+60	+11	+52	+125	+31	+88	+190
-28	**-19**	**-2**	**-8**	**+17**	**+62**	**+11**	**+53**	**+127**	**+31**	**+89**	**+192**
-27	-18	-0	-7	+18	+64	+12	+54	+129	+32	+90	+194
-27	**-17**	**+1**	**-7**	**+19**	**+66**	**+12**	**+55**	**+131**	**+32**	**+91**	**+195**
-26	-16	+3	-6	+20	+68	+13	+56	+132	+33	+92	+197
-26	**-15**	**+5**	**-6**	**+21**	**+69**	**+13**	**+57**	**+134**	**+33**	**+93**	**+199**
-25	-14	+6	-5	+22	+71	+14	+58	+136	+34	+94	+201
-25	**-13**	**+8**	**-5**	**+23**	**+73**	**+15**	**+59**	**+138**	**+35**	**+95**	**+203**
-24	-12	+10	-4	+24	+75	+15	+60	+140	+35	+96	+204
-23	**-11**	**+12**	**-3**	**+25**	**+77**	**+16**	**+61**	**+141**	**+36**	**+97**	**+206**
-23	-10	+14	-3	+26	+78	+16	+62	+143	+36	+98	+208
-22	**-9**	**+15**	**-2**	**+27**	**+80**	**+17**	**+63**	**+145**	**+37**	**+99**	**+210**
-22	-8	+17	-2	+28	+82	+17	+64	+147	+37	+100	+212
-21	**-7**	**+19**	**-1**	**+29**	**+84**	**+18**	**+65**	**+149**	**+38**	**+101**	**+213**
-21	-6	+21	-1	+30	+86	+18	+66	+150	+38	+102	+215
-20	**-5**	**+23**	**-0**	**+31**	**+87**	**+19**	**+67**	**+152**	**+39**	**+103**	**+217**
-20	-4	+24	-0	+32	+89	+20	+68	+154	+40	+104	+219

Examples : 29°C = +84°F ; 29°F = -1 °C

INITIAL HEATING TIME AND DISPENSE VOLUME FROM THE HV2—BASED ON INCOMING TEMPERATURE

INCOMING TEMPERATURE	START UPTIME IN MINUTES	GALLONS PER HOUR	GALLONS PER MINUTE	6 OZ. CUPS PER HOUR	6 OZ. CUPS PER MINUTE
45	27.3	39.6	.7	830.7	13.8
50	26.4	40.9	.7	859.3	14.3
55	25.5	42.4	.7	890.0	14.8
60	24.6	44.0	.7	923.0	15.4
65	23.7	45.6	.8	958.5	16.0
70	22.8	47.5	.8	996.8	16.6
75	21.8	49.4	.8	1038.4	17.3
80	20.9	51.6	.9	1083.5	18.1
85	20.0	53.9	.9	1132.8	18.9
90	19.1	56.5	.9	1186.7	19.8
95	18.2	59.3	1.0	1246.1	20.8
100	17.3	62.5	1.0	1311.6	21.9
105	16.4	65.9	1.1	1384.5	23.1
110	15.5	69.8	1.2	1465.9	24.4
115	14.6	74.2	1.2	1557.6	26.0
120	13.7	79.1	1.3	1661.4	27.7
125	12.7	84.8	1.4	1780.1	29.7
130	11.8	91.3	1.5	1917.0	32.0
135	10.9	98.9	1.6	2076.8	34.6
140	10.0	107.9	1.8	2265.6	37.8
145	9.1	118.7	2.0	2492.1	41.5
150	8.2	131.9	2.2	2769.0	46.2
155	7.3	148.3	2.5	3115.1	51.9
160	6.4	169.5	2.8	3560.2	59.3
165	5.5	197.8	3.3	4153.5	69.2
170	4.6	197.8	3.3	4153.5	69.2

At an incoming temperature of 170°F. the dispenser will maintain the correct dispense temperature - operating at full capacity.

OPERATING PANEL INDICATOR LIGHT REFERENCE CHART
(Overnight Switch and Power 0n Lamp are both on)

SELECT SWITCH POSITION	SMALL READY INDICATOR	LARGE READY INDICATOR	DISPENSER OPERATI0N	PACKAGE CONDITION	WATER TEMPERATURE
Small	Off	Off	No Dispense	Both OK	Too Cold
Small	Off	Red	No Dispense	Right Empty	Too Cold
Small	Red	Off	No Dispense	Left Empty	Too Cold
Small	Red	Red	No Dispense	Both Empty	Too Cold
Small	Yellow	Off	1/2 Speed	Left Empty	OK
Small	Yellow	Red	No Dispense	Both Empty	OK
Small	Green	Off	Small Speed	Both OK	OK
Small	Green	Red	1/2 Speed	Right Empty	OK
Large	Off	Off	No Dispense	Both OK	Too Cold
Large	Off	Red	No Dispense	Right Empty	Too Cold
Large	Off	Yellow	1/2 Speed	Right Empty	OK
Large	Off	Green	Large Speed	Both OK	OK
Large	Red	Off	No Dispense	Left Empty	Too Cold
Large	Red	Red	No Dispense	Both Empty	Too Cold
Large	Red	Yellow	No Dispense	Both Empty	OK
Large	Red	Green	1/2 Speed	Left Empty	OK

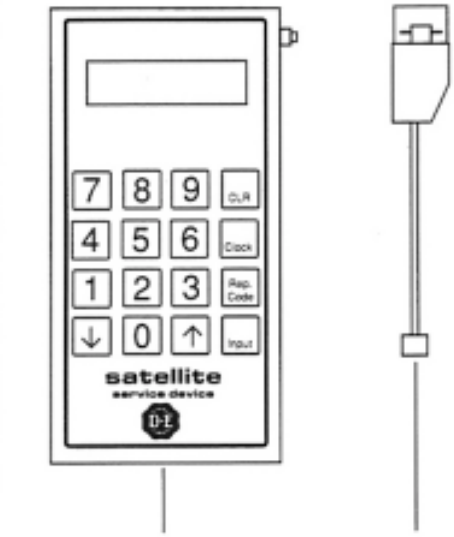
3. PROGRAMMING THE DISPENSER

Dispensing information (i.e., the strength of the coffee, the sizes that are automatically delivered, and other dispense options) is stored in the memory of the microprocessor board.

Because each end user may have different preferences, this information can be changed by using the service device to access this memory.

The following chart outlines the HV2 programming sequence. The numbered steps at the left side of the chart are basic steps in the operation of the service device. The information shown in the boxes is an actual representation of what will be seen in the display window of the service device.

Following the chart, complete instructions are found. It is suggested that the instructions be read through prior to actually programming the dispenser. The chart can then be used as a quick reference.



The service device and cable *(Part number H0913)* are necessary in order to change any of the dispensing information stored in the microprocessor board.

3.1 HV2 PROGRAMMING SEQUENCE

See the following pages for an explanation of adjustments and options.

1. Connect the 9-pin Programming Adapter to the dispenser.

2. Turn the Service Device on.
   You will see this display. The date shown in the ( ) may be different.

SERVICE DEVICE V1.4 (15-04-88)

3. Switch the Dispenser Overnight Switch to the OFF position.
   If already off, switch it ON and then back OFF.

4. You will see

HV2 DECS USA 1.0 # 000000000000

   or

- ERROR- LAST DOSING

   Press the Input Key.

5. To change the Flow Rate, press the Clear Key. Enter the new value with the number keys.

FLOW=0096 CC/SEC MIN:65 MAX:125

   Press the Input Key.

6. Select the desired option by pressing the number indicated on the display.

HIGH VOLUME LARG 1=HV BOTH SIDES

   Press the Input Key.

7. Select the desired option by pressing the number indicated on the display.

STOPBUTTON = STOP 2=USE FOR FLUSH

   Press the Input Key.

8. To change the Large Ratio, press the Clear Key. Enter the new value with the number keys.

RATIO(L)= 1:36 MIN:24 MAX:99

   Press the Input Key.

9. To change the Large Size, press the Clear Key. Enter the new value with the number keys.

SIZE(L) = 03700 CC MIN:1500 MAX:80000

   Press the Input Key.

If 'HV Both sides' is selected, the ranges of ratio and size options change to small setting

HIGH VOLUME BOTH 2= HV LARG SIZE

STOPBUTTON = STOP 2=USE FOR FLUSH

RATIO(L)= 1:36 MIN:24 MAX:99

SIZE(L) = 03700 CC MIN:1500 MAX:80000

If 'HV Both sides' is selected:

10. Select the desired option by pressing the number indicated on the display.

    Press the Input Key.

LARG DOSING=CONT 3=PORTION	LARG DOSING=CONT 3=PORTION

11. Select the desired option by pressing the numbeR indicated on the display.

    Press the Input Key.

LARG PRODUCT=COFFEE 2=TEA	LARG PRODUCT=COFFEE 2=TEA

12. Select the desired option by pressing the number indicated on the display.

    Press the Input Key.

SMALL DOSING = CON 2=REP 3=PORTION	SMALL DOSING = CON 2=REP 3=PORTION

13. To change the Small Ratio press the Clear Key. Enter the new value with the number keys.

    Press the Input Key.

RATIO(S) = 1:36 MIN:12 MAX:99	RATIO(S) = 1:36 MIN:12 MAX:99

14. To change the Small Size press the Clear Key. Enter the new value with the number keys.

    Press the Input Key.

SIZE(S)=1500 CC MIN:40 MAX:2000	SIZE(S)=1500 CC MIN:40 MAX:2000

15. To change the Pause Time press the Clear Key. Enter the new value with the number keys.

    Press the Input Key.

PAUSE = 00 SEC MIN:0 MAX:5	PAUSE = 00 SEC MIN:0 MAX:5

16. Select the desired option by pressing the number indicated on the display.

    Press the Input Key. -

COUNTER DISABLED 2=ENABLED	COUNTER DISABLED 2=ENABLED

17. Press "1" to save new values or press "2', to default to previous values.

SAVE VALUES? 1=YES 2=NO	SAVE VALUES? 1=YES 2=NO

IF YES	IF NO
VALUES SAVED HV2 UPDATED	VALUES NOT SAVED NOT CHANGED

3.2 PROGRAMMING THE HV2 DISPENSER

This section deals with changing the various settings of the microprocessor board to better suit the needs and requirements of the end user.

The service device (H0913) and a programming adapter (AS2/Prestige type) are necessary to change any of the settings of the microprocessor.

The display window of the service device will indicate the various options available within the program of the dispenser and the choices and ranges of each option.
Changes are accomplished by using primarily the “Input,” “Clear,” and numeric keys of the service device.

The following numbered steps are in the Same order as the previous chart “HV2 Programming Sequence” but explained in greater detail. The display windows shown on the chart are representative of the actual display of the service device.

1. Connect the programming adapter to the service device, and to the 9-pin socket of the dispenser which is located behind the main door, on the cover to the right of the cooling compartment door.

2. Turn on the service device by pressing the activating button on the right side of the case. The service device is designed to switch itself off if the keyboard is not operated for a period of over 30 seconds.
   If so, the activating button on the service device has to be pressed to restart the procedure.

3. To start the communication between the service device and the dispenser, switch the overnight switch on the dispenser to the “Off” position. If the dispenser was already off, switch it “ON” briefly and then back “Off.” (It is the result of the dispenser turning off that causes the service device to begin communication.)

Once the programming sequence has been started, the service device expects to step through the program within a certain amount of time. If too long a period of time elapses between key presses, any time during the programming sequence, the service device will indicate:

- ERROR-
VALUES NOT SAVED

If this occurs, it is NOT necessaty to disconnect the service device or wait for it to shut off. Just switch the dispenser “On” then “Off” as stated at the beginning of Step 3. Any changes made to the program up to the error will be lost, so the service device will restatt itself at the beginning.

4. The service device should now display one of the messages shown in Step 4 of the chart. The message “-ERROR - Last dosing” does not necessarily indicate a problem with the dispenser. If the dispenser had been previously put into a dispense cycle with something other than the product packages blocking the concentrate coils, the microprocessor will recognize this as an “error.” In general, this message can be ignored.
   If a significant dosing problem exists in the dispenser, it will be indicated by flashing red indicators on the front panel of the dispenser.

5. The **flow rate** of the dispenser must be calculated, and entered into the microprocessor so that the rest of the calculations made by the microprocessor are accurate. The flow, expressed in cubic centimeters (milliliters) per second, is the amount of water dispensed by each (of two) water outlet valve in the dispenser. Without this information, the microprocessor can not properly figure the correct ratio and volume indicated by the rest of the program information. The number used when the dispenser is manufactured is generally an accurate starting point. In order to check the flow rate, program the following information into the microprocessor:

TEMPORARY MICROPROCESSOR SETTINGSUSED FOR DETERMINING DISPENSER FLOW RATE

Flow	96	Large Coffee	Coffee
High Volume	Both	Small Dosing	Portion
Stop Button	Stop	Ratio(s)	1:24
Ratio (L)	1:24	Size(s)	1500
Size (L)	1500	Pause	00
Large Dosing	Portion	Counter	Disabled

After the values are programmed into the board, flow rate number can be checked as follows:

A. Do not use product. Block the dosing coils so the dispenser does not indicate empty.

B. Dispense from the small ponion, collecting the water in a pot. Because the small ponion is programmed to dispense in high volume mode, both water outlet valYes will open.

C. Measure, and make note of the volume of water disperised.

D. Unblock the left coil (the left empty indicator will come on).

E. Dispense from the small portion. Collect, measure, and note the amount of water dispensed. Because the left side is empty, the microprocessor will activate only the right water valve, and make the necessary timing calculation so that the same amount of water is dispensed as in step B.

F. Unblock the right coil, and block the left coil. (The left empty indicator goes out, and the right comes on.)

G. Dispense from the small portion. Collect, measure, and note the amount of water dispensed. This time the right side is empty, so only the left coil operates. Again, the microprocessor should make the necessary corrections in order to deliver the same amount of water.

   If the mechanical components of the dispenser are correct, the three volumes should be within 59b of each other.

H. The three readings should be averaged. (Vol step C + Vol step E + Vol step G) divided by 3. This will take into account any variations between the water valves.

   Based on the formula: Water Volume = (1500 - 11500/(24 + 1) } = (1500 - 60) = 1440 The average obtained in Step H should be 1440 cc.

   If the average measurement is LESS than 1440, the FLOW should be REDUCED. If the average is GREATER than 1440, the FLOW should be INCREASED.

Reducing or increasing the FLOW should be continued until the average of the measured volumes is within 2% of 1440. After the FLOW is properly set, the dispenser can be programmed as desired.

6. Selecting **High Volume Large** will allow the dispenser to dispense at two different rates. The Small ponion will dispense at approximately 96 cc/sec (3.25 oz/sec), and the Large ponion will dispense at 192 cc/sec (6.5 oz/sec). The slower flow rate on the Small ponion will be desirable when the dispense volume is relatively small to prevent excessive splashing and foaming. The small ponion setting will then be adjustable from 40 cc to 2000 cc. By selecting **High Volume** Both, the large and small ponion settings will both flow at the faster (196 cc/sec) flow rate. The Small ponion setting will then be adjustable from 1500 cc to 20000 cc.

7. The **Stop Button** on the front panel can be set to be used for either a stop function or a flush function. It needs to always be set for Stop button = stop for normal installations because the end user always needs to be able to terminate a dispense cycle. Stop button = Use for flush would only be selected for service reasons; such as determining if incoming flow rate will keep up with outlet flow.

8. The **Ratio (L)** is the strength of the coffee dispensed in the Large ponion. It is adjustable within a range of from 1:24 to 1:99. The ratio of the Large and Small ponions are adjustable independently from each other in the event the end user would like to use weaker coffee (say I :40) for banquet feeding in order to control costs, but serve Small pots to a restaurant area a; a stronger (I :36) ratio for richer flavor.

9. Adjust the **Large Size** to suit the end users requirements. The range of adjustment is from 1500 cc to 80000 cc. With roughly 30 cc per ounce, this is a range of from 50 ounces to just over 20 gallons.

10. **Large dosing** can be programmed to continuous flow or pre-measured portion. In continuous flow, the dispenser would continue to produce coffee as long as the start button was depressed. In portion mode, the portion size adjusted in step 9 would automatically dispense with one press of the start button.

11. **Large product type** can be set for Coffee or Tea product. For all practical purposes, this setting should always remain with Coffee selected. Selecting Tea product only changes the sensitivity of the Empty sensing circuit, and has no other effect on the dispenser.

12. **Small dosing** can be prog,rammed as explained in Step 10, but has one additional option. A repeat mode can be selected which will allow the small ponion to repeat the pre-selected small ponion size as long as the start button is depressed. This would suit an end user who fllled a 16 oz and 32 oz container, allowing one press for the 16 oz, and holding the button into the second cycle to flll the 32 oz.

13. **Ratio (S)** is the setting for the strength of the coffee dispensed in the Small setting. The reason has been explained in step 8. When the dispenser is programmed to High Volume Large, the range of the small ratio is from 1:12 to I :99. If the dispenser is programmed to High Volume Both, the range is from I :24 to I :99. The narrower range resulting from the faster water flow rate when High Volume Both is selected.

14. The **Small Size** is adjustable from 40 cc (1.3 oz) to 2000 cc (66 oz) when the dispenser is in High Volume Large mode, and from 1500 cc (50 oz) to 20000 cc (5 gallons) when in High Volume Both mode. Note that it would not be possible to deliver, for example, a 32 oz volume from the small if the dispenser was in the High Volume Both mode.

15. The **Pause Time** is the amount of “rest” time necessary between dispense cycles. It can be adjusted from 0 seconds, and the dispenser can immediately go into another cycle, or up to 5 seconds to discourage “topping off” a container by re-pressing the start button which usually results in overfllling a container.

16. The **Counter Display** can be either turned on by selecting “enabled” or turned off by selecting “disabled.”

17. **Save Values** by selecting “yes” if you want the infommation just programmed to be saved, or select “no,” and the Microprocessor will default to the values previously in use before the programming procedure was staned.

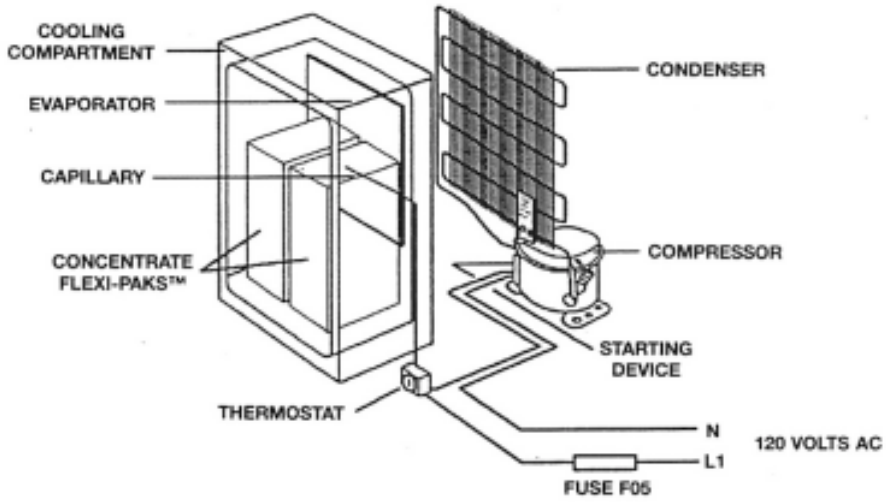
Many times, it would appear that the microprocessor is not working properly because the new settings are not retained, but it is generally the result of not answering “yes,” or letting the service device time out before answering “yes.”

The arrow keys on the service device can be used to go back and forth between the various displays, but it is recommended that the previous procedure as shown in the chan be used in the correct order until thoroughly familiar with the program.

4. CONCENTRATE COOLING SYSTEM

The cooling system is a conventional freon type unit operating on 120 volts AC. The source of 120 volts AC is obtained from the Neutral and Line 1 of the main terminal block. Line 1 passes over FO5, a 15 amp branch circuit protection fuse.
The cooling thermostat is mounted behind the access panel beside the cooling compartment inside the main door. Remove the four screws to adjust the setting of the thermostat. A normal setting of 1-2 will ensure the correct concentrate temperature of 36-43°F.

The sensor of the thermostat is mounted to the evaporator inside the cooling compartment. A compartment temperature which is too high causes an increase of pressure in the capillary, causing the contacts of the thermostat to close and supply power to the compressor.



Mains voltage flows through the starting device, the comptessor start winding, and the compressor run winding which is connected in parallel. The compressor starts up, the start winding providing the extra torque required for starting. It remains in circuit until the starting device warms up and the increase in resistance cuts off the current flow.

The compressor continues to run on the run windings, drawing heat from the cooling compartment through the evaporator and giving it up to the atmosphere through the condenser on the rear of the dispenser.

The pressure in the thermostat capillary reduces with decreasing temperature. The thermostat contacts open when the preset temperature is reached, cutting off the 120 volts to the compressor.

An overload protection cut-out is integrated in the compressor winding. An abnorrnally high current draw or overheating causes the overload to break the circuit. A cooling down time of up to 45 minutes may be necessary for the device to properly reset after an overload condition.

5. POWER PACK

LOW VOLTAGE POWER SUPPLY

The function of the power pack is to provide the low voltages necessary to operate the various control circuits in the dispenser.

A line voltage of 120 volts AC is provided to the power pack from the neutral, and LI terminals of the main terminal block.

Transformers step this voltage down to the appropriate low voltages needed for the dispenser circuits.

Rectifiers convert the stepped down AC voltage to DC as necessary.

This 120 volt circuit is protected by a 15 amp branch circuit protector (F05) and a panel mounted 2 amp fuse (FO1).
In the event of a transfommer failure, the 2 amp fuse will blow. If a major short circuit in the wiring should occur, the 15 amp branch circuit protector will blow.

The low voltages and the circuits they power are as follows:

Transformer T1 provides 24 VAC for the **water inlet,** and water **heating control circuit.**
The output of T1 is protected from overload by F06, an inline 3.2 amp fuse, and F04, a panel mounted 3.15 amp fuse.

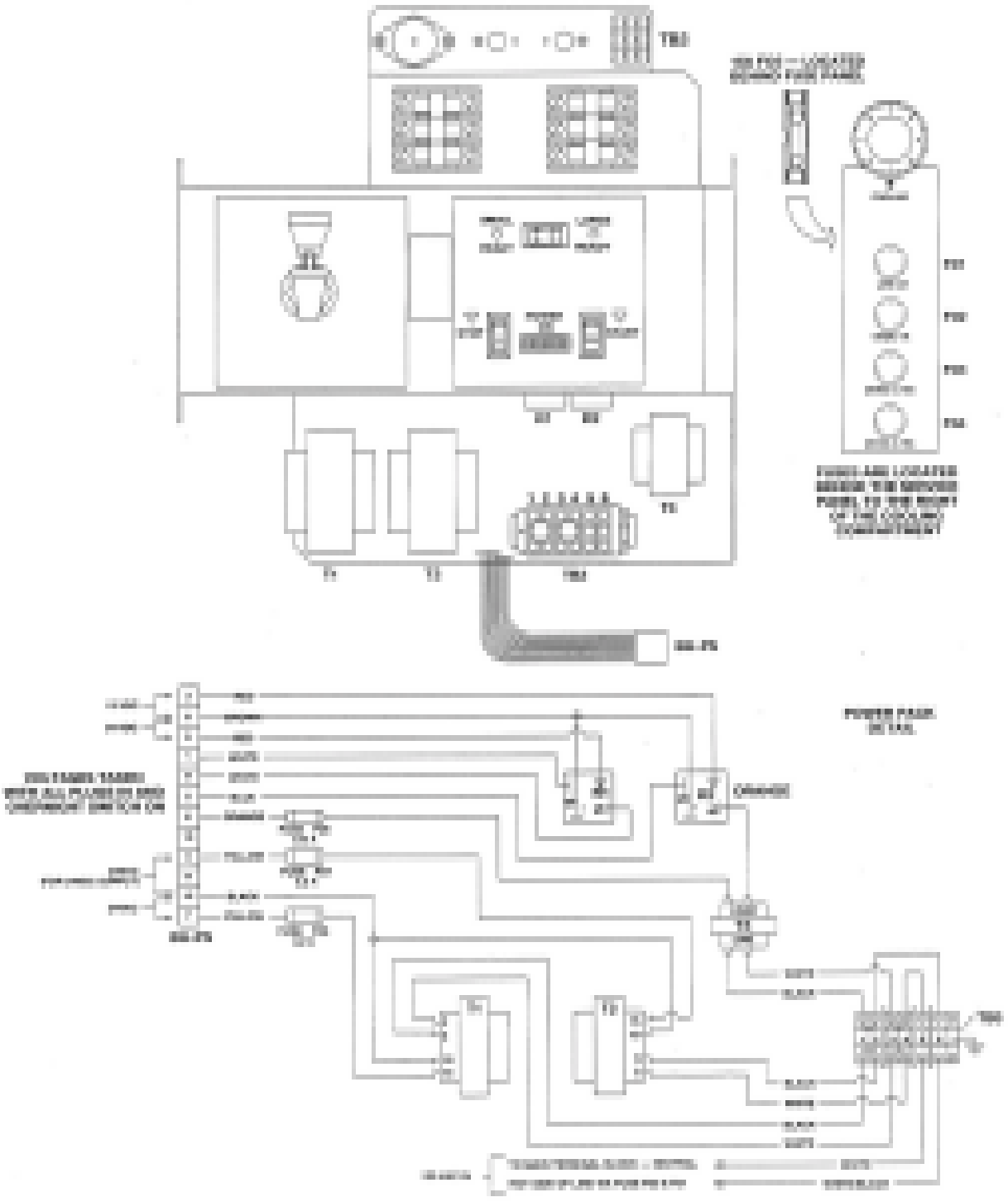
Transformer T2, along with **Rectifer R1** provide **24 VDC for the** concentrate and water dispense circuits, the power on lamp, and the front panel start, stop, and select switches.
The output of T2 is protected from overload by F07, an inline 3.2 amp fuse, and F03, a panel mounted 3.15 amp fuse. Fuse F03 also indirectly protects the rectifier as it senses the current demands of the input current to the rectifter.

Transformer T3 and Rectifer R2 provide **13 VDC** to operate the microprocessor board. Without this voltage, the microprocessor can not properly route the signals necessary for the dispense functions to operate.
The output of T3 is protected from overload by F08, an inline 5.0 amp fuse, and F02, a panel mounted 1 amp fuse. Fuse F02 also protects the Rectifier as mentioned in the earlier text.

Terminal Block TB3 serves to connect the three transforrners to the 120 volt source.

Plug BU-PS connects all low voltage circuits to and from the power pack.

POWER PACK (DETAIL)



6. WATER INLET AND LEVEL CONTROL

ELECTRICAL

The inlet circuit operates on 24 volts AC. The 24 volts from the power pack pass over fuse F 04 and the overnight switch before reaching the base circuit board. The base circuit board serves to interconnect the 24 volts to the float switch and then the inlet valve.

Whenever the float switch lever is pulled down by the float, the switch closes and provides 24 volts to the inlet valve.

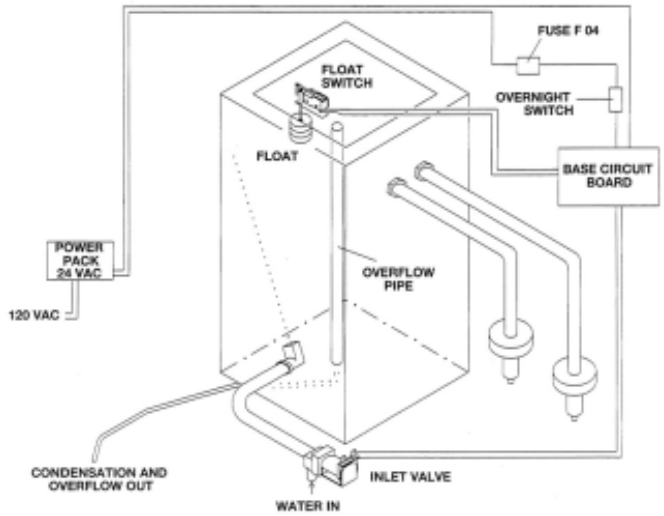
MECHANICAL

The water tank is non-pressurized, vented to the outside by the overflow pipe. The top of the overflow pipe is normally above the water level in the tank.

When initially installing the dispenser, the tank is empty and the float should be hanging on the arm of the float switch - pulling it down. This electrically activates and opens the inlet valve allowing water into the tank.
When the water level rises to a pre-determined level, the float rises - shutting off the inlet valve and stopping the water flow. When the dispenser is in use and water is dispensed from the tank, the float will fall opening the inlet valve when necessary. This operahon will maintain the correct level in the tank.

The incoming water is directed to the upper left comer of the tank which agitates the water as the tank is filling and allows colder water to contact the water temperature thermostat. This will activate the water heating circuit more quickly during periods of casual use.

It is important to be sure that the water supply to the dispenser is fast enough to keep up with the outlet flow of the dispenser. If the inlet supply is insufficient, it will not be possible to maintain the proper amount of water in the tank and the outlet flow will be inconsistent.
In the event of a malfunction and the water level becomes too high in the tank, the water will run into the top of the overflow pipe and exit the dispenser via the condensatton and overflow outlet pipe.



7. WATER TEMPERATURE CONTROL

ELECTRICAL

The water temperature circuit consists of two sections. The majority of the components are part of the low voltage (24VAC) control circuit. This control voltage energizes the contactors when the dispenser needs to reheat. The 208 volt line voltage is switched over the contacts of the contactors to apply power to the three heating elements.

THE CIRCUIT OPERATES AS FOLLOWS:
The power pack supplies 24 volts AC which passes over fuse F 04 and the overnight switch before reaching the base circuit board. The base circuit board serves to interconnect the 24 volts to the heating (tank temp) thermostat and the contactors. The high temp limiter is in series with one wire that supplies the 24 volts to the contactors. In operation, whenever the dispenser needs to heat the water, the contacts of the tank temp thermostat close. This sends 24 volts out of the base circuit board.
The high temp limiter is normally closed so the 24 volts reaches the contactors causing both contactors to close.

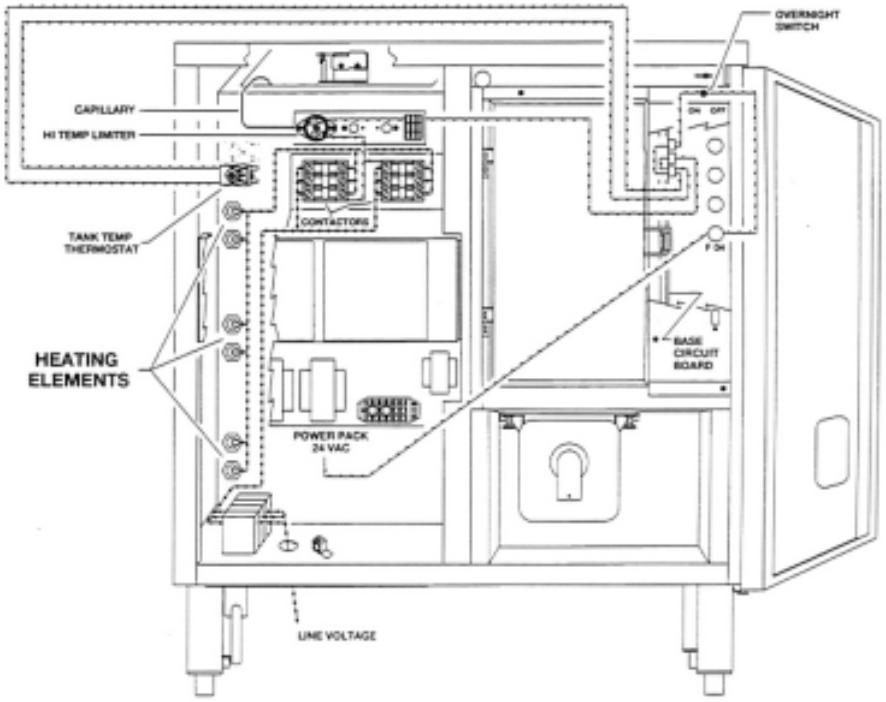
THE HIGH TEMP LIMITER IS AN IMPORTANT SAFETY DEVICE! IT SHOULD NEVER BE BYPASSED OR ELIMINATED FROM THE CIRCUIT.

If the elements are activated with insuff~cient water in the tank, the capillary of the high temp limiter (which is mechanically fastened to the top heating element) senses an abnommally high temperature. This high temperature causes the contacts of the limiter to open which interrupts the 24 volts going to the contactors. The contactors open, shutting off the elements.

Two contactors are used so that both sides of the line 208 volts are switched on and off to three separate elements. This switching method provides an extra margin of safety because when the heat is off there is no power at either temminal of any element. Using three elements assures that heat is evenly produced throughout the water. This prevents cold water layers from forming. Each element provides 4945 Waus of heating power for a total of 14,835 Watts.

MECHANICAL

This illustration details the component mounting locations and the voltage flow through the circuit.



8. DISPENSE CIRCUITS

WATER DISPENSE AND CONCENTRATE DISPENSE

ELECTRICAL

Two voltages are provided by the power pack to operate the dispense circuits.

13 volts DC, protected by fuse F02, is routed to the base circuit board. On the base circuit board, this voltage is regulated to S volts. The S volts is used for all of the logic functions on the microprocessor board. These logic circuits include all of the timing functions, portion sizes and the ratio of water to concentrate. In addition, the logic circuits interpret signals from the product coils to detemmine if the coffee packages are empty. If the microprocessor determines that one package is empty, it will automatically make the necessary adjustments so that a dispense cycle in progress will continue at the correct ratio and portion size.

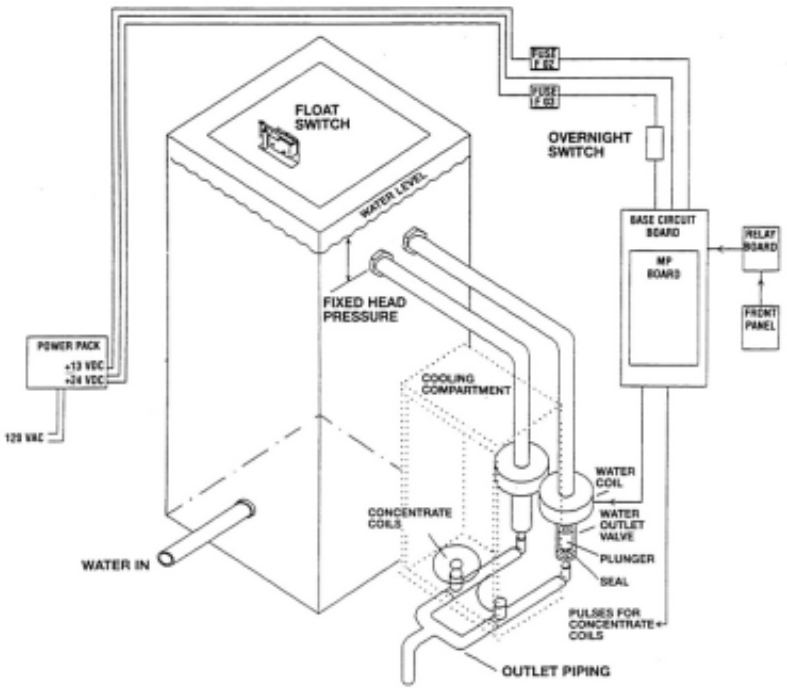
24 volts DC, protected by fuse F03 and switched on and off by the overnight switch, is routed to the base circuit board and then distributed to the microprocessor board to operate the water dispense valves. On the microprocessor board this voltage is developed into pulses which operate the coffee concentrate dispense coils. Additionally, the 24 volts DC is used in the operation of the front control panel indicators and switches. By turning the overnight switch off, the 24 volts DC is switched offdisabling the front panel controls and dispense circuits.

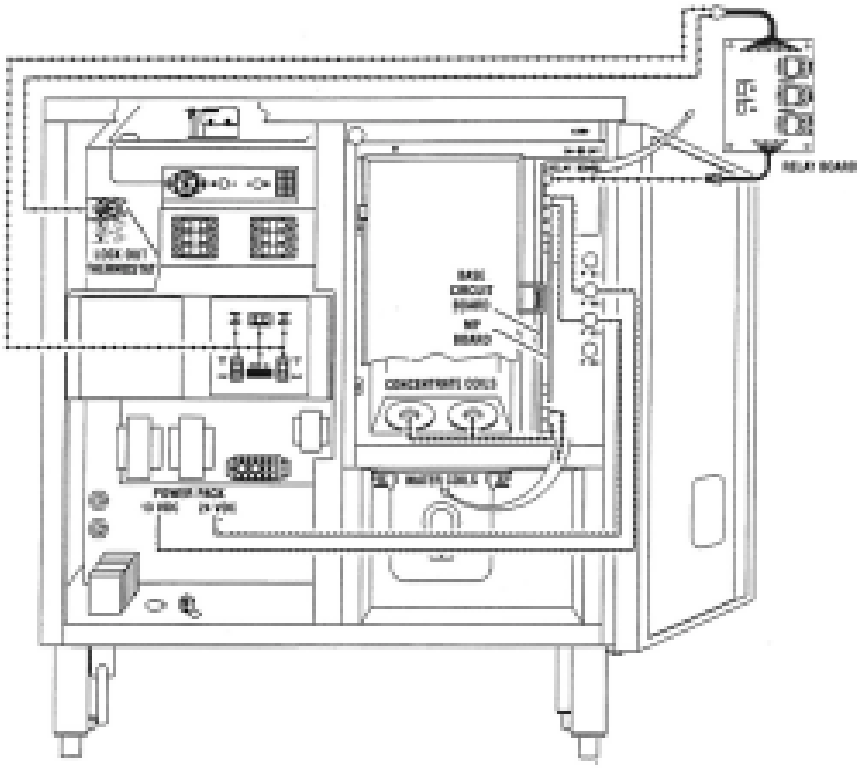
MECHANICAL

Water, being maintained at a constant level and temperature as mentioned earlier, is always at a f~xed head pressure at the water outlet valves. These valves contain a plunger and seal held down by gravity to prevent water from nommally dispensing. During a dispense cycle, 24 volts DC is applied to the water outlet valve coils creating a magnetic field and lifting the plunger. This allows the water to exit at a fixed and constant rate.

With precise timing detemmined by the microprocessor, pulses to the concentrate coils are turning on and offto operate a pump built into each concentrate package. The frequency (number of pulses per second) determines the amount of concentrate to be dispensed.

Water and concentrate are mixed in the outlet piping to produce the funished product.





INDICATOR LIGHTS AND SWITCHES

The indicator lights (large and small green “Ready” lamps, left and right red empty lamps—which are contained within the “Ready” larnps, artd the **orange** “Power On” lamp) as well as the “Start,” “Select,” and “Stop” switches discussed in the next few paragraphs are all located on the main, black control panel.

The “Overnight” switch is located behind the main door along the upper frame to the right of the cooling compartment door.

LOCKOUT CIRCUIT

A second thermostat is provided on the water tank to serve as a monitor of the water temperature in the tank. It is part of the dispense circuit and is independent of the heating circuit. If the tank temperature drops below the desired minimum dispense temperature as indicated on the lockout thermostat, the dispense circuits are disabled. The appropriate green “Ready” indicator (“Large” or”Small”—depending on the position of the “Select” switch) will go out until the water is allowed to re-heat to an acceptable temperature.

This circuit will not stop a dispense cycle already in progress.

The lockout thermostat can be adjusted to any temperature required by the end user, or can be tuned completely

off if the lockout function is not desired. (Of course it must always be set to a temperature lower than the maximum tank temperature or it will continually cause an indication that the tank temperature is too low.)

EMPTY CIRCUIT

An infra-red transminer (LED) and receiver (phototransistor) are mounted opposite each other within each concentrate coil assembly. When coffee concentrate is present in the dosing tube on the package, a float rises and blocks the path of the infra-red beam.

Without concentrate in the tube, the float drops, and allows the beam to pass from the transminer to the receiver. When the beam reaches the receiver, the lowered resistance of the receiver causes the microprocessor to disable the dispense functions from that particular concentrate and water dispense coil, and to illuminate the appropriate red LED within the ready indicator on the control panel. A left side package empty condition is indicated by the leh or “Small” indicator, and a right side package empty condition is indicated by the right or ”Large” indicator.

OPERATION OF A TYPICAL DISPENSE CYCLE

Whenever the dispenser is switched on, 13 volts DC and 24 volts DC are supplied to the base circuit and micro-

processor boards. The 24 vols DC is also supplied to the relay board and orange “Power On” lamp.
In the following example the overnight switch is on and there are two full packages of concentrate in the cooling compartment.

When the water in the tank is too cold, the contacts of the lockout thermostat are closed. This energizes the lockout relay on the Relay board, opening a set of contacts within the relay and disconnecting the 24 volts DC from the rest of the operating controls. The orange “Power On” lamp is illuminated, but no dispense functions are possible. Neither green “Ready” indicator is on.

After the water is up to a temperature acceptable to the Lockout thermostat, the lockout relay drops out, closing the contacts and supplying 24 volts DC to the “Select” switch.

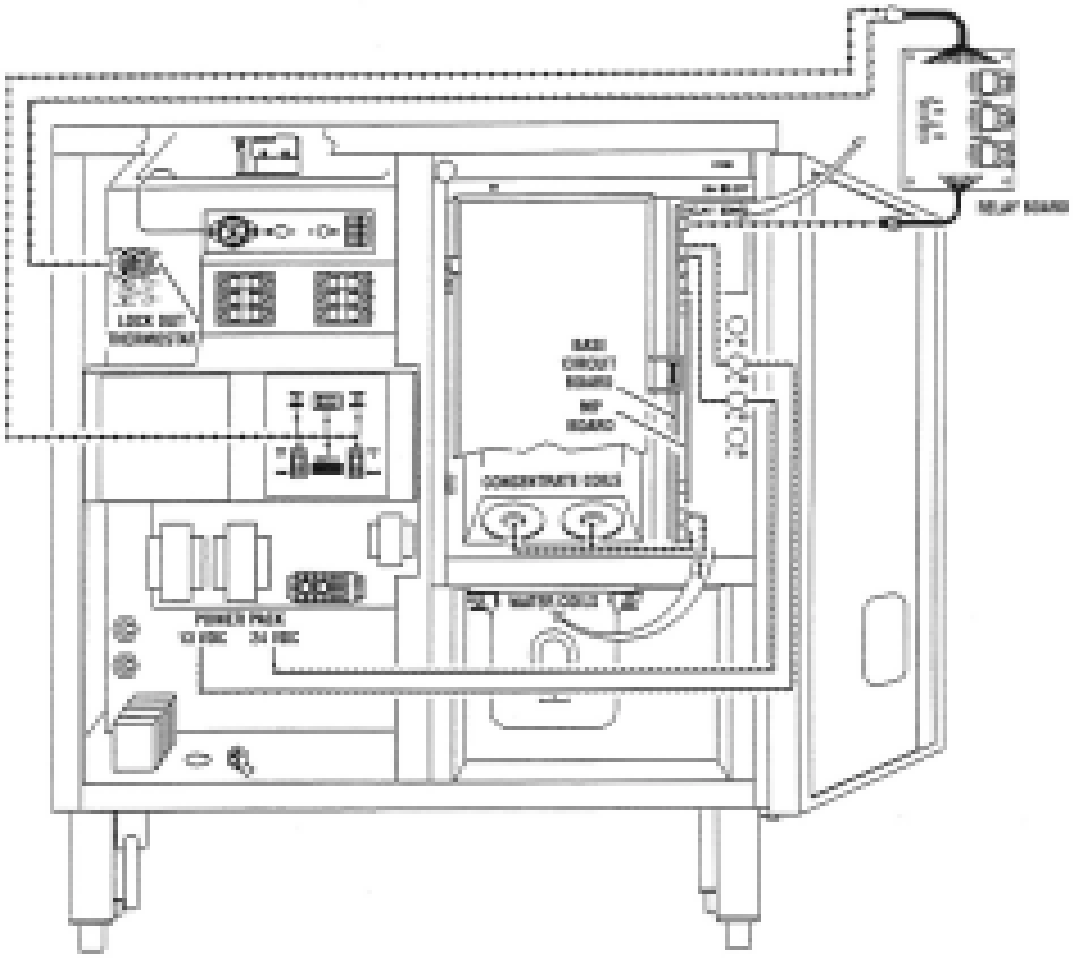
Depending on the position of the “Select” switch (“Large” or “Small” position) power is supplied to one side of either the large or small relay on the relay board. Simultaneously, power is supplied to the appropriate green “Ready” indicator on the control panel.

Pressing the “Start” switch supplies power to the other side of the selected relay. The relay energizes, closing a set of contacts which start a dispense cycle on the microprocessor board.

The microprocessor board supplies 24 volts DC to the water outlet valve coil (or coils if the dispenser is programmed to dispense in “High Volume” mode), and simultaneously supplies DC pulses to the concentrate coil (or coils) to operate the pumps within the concentrate packages.

If one concentrate package becomes empty while the dispense cycle is in progress, the microprocessor will shut off the voltage to the corresponding water coil, stop supplying pulses to the coil of the empty package, illuminate the appropriate red indicator and automatically adjust the timing so that the correct flnished volume and ratio are dispensed.

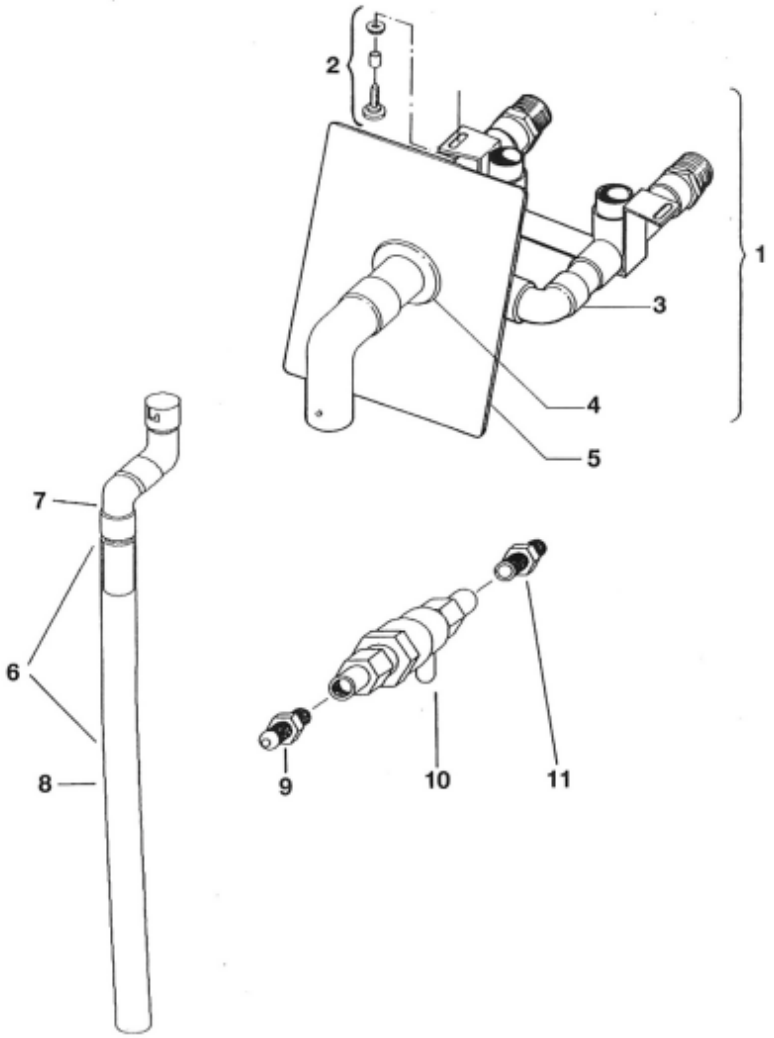
Pressing the “Stop” switch resets the microprocessor which stops the dispense cycle, shuts all dispense valves and resets any timed portion to the beginning. Pressing the “Start” switch will start at the beginning of a new, full portion size. It does not restart from where it was interrupted.



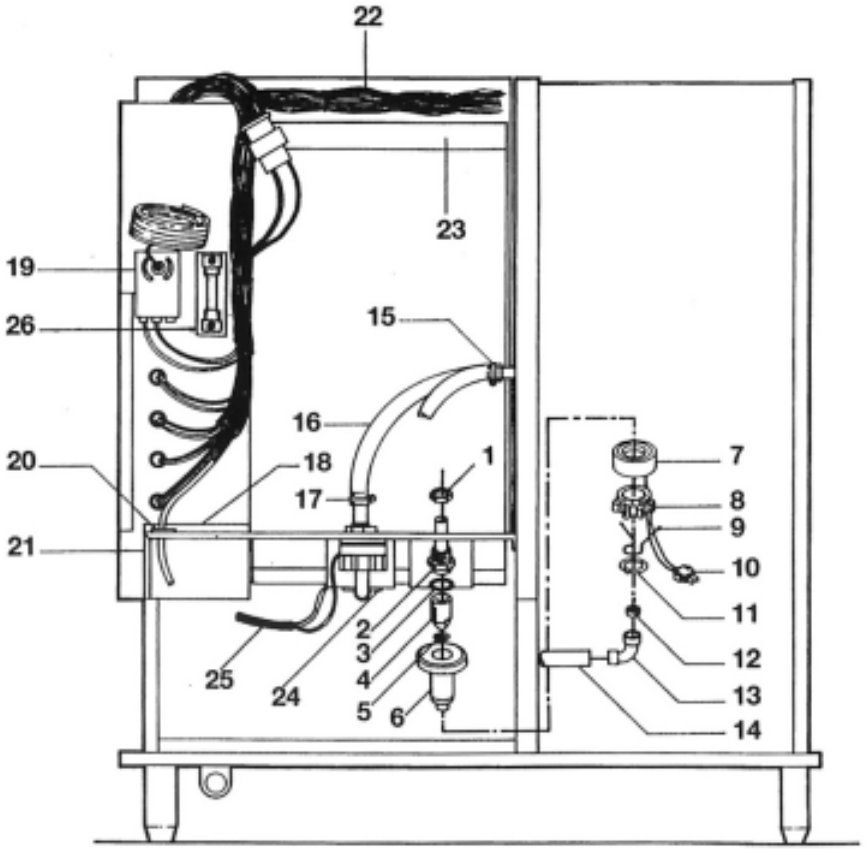
Parts Listing Contents

Section 1	**Coffee draw-off assembly, Adapter hose, Back-flow preventer**
Section 2	**Water outlet valves, Outlet Fittings, Cooling themostat, Main harness, Branch circuit fuse, Compressor hardware**
Section 3	**Water tank components, Heating thermostat, Heating elements, Tank hardware**
Section 4	**Cooling compartment, Concentrate coils, Inlet valves, Fuses (incl. holders), Base PCB, Main terminal block, Water Faucet**
'Section 5	**Power pack components, Front panel switches, LED display PCB**
Section 6	**Main chassis, Relay PCB, Microprocessor PCB, PCB Access cover, Programming extension cable, Labels, Element Harness**
Section 7	**Cabinet front, Lock/Keys, Legs**
Section 8	**Cabinet panels, Chassis structure**
Section 9	**Interconnect plugs and pins, Terminals**

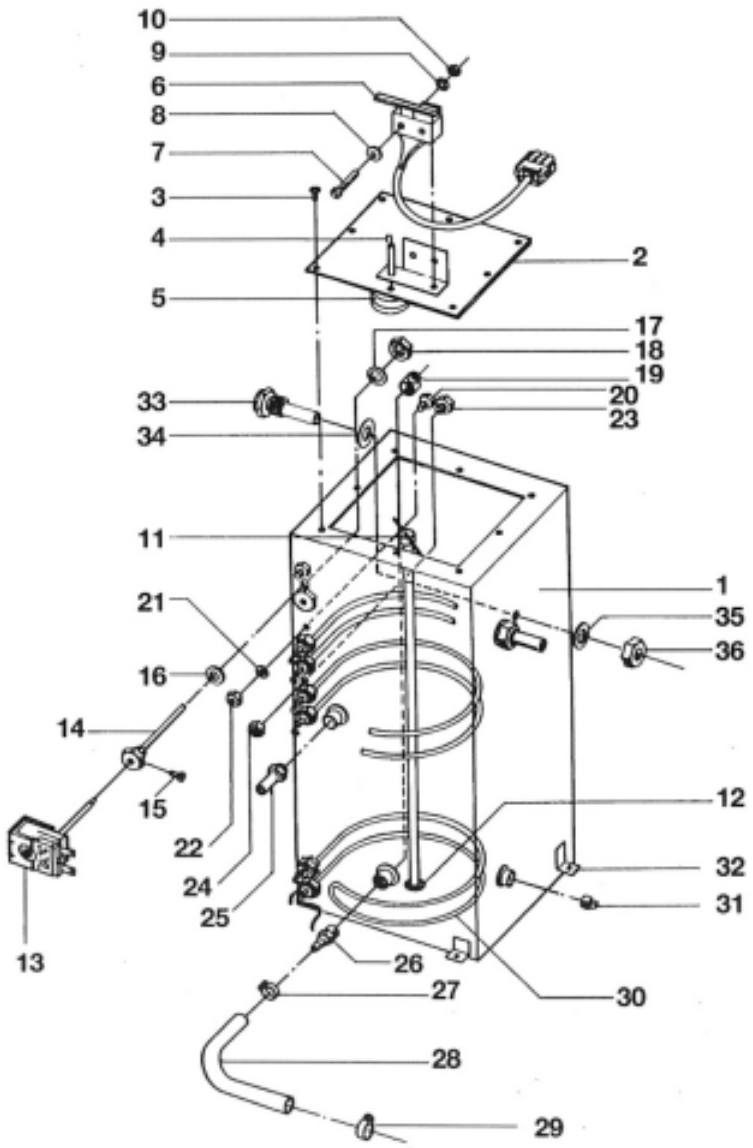
Section 1 Coffee draw-off assembly, Adapter hose, Back-flow preventer



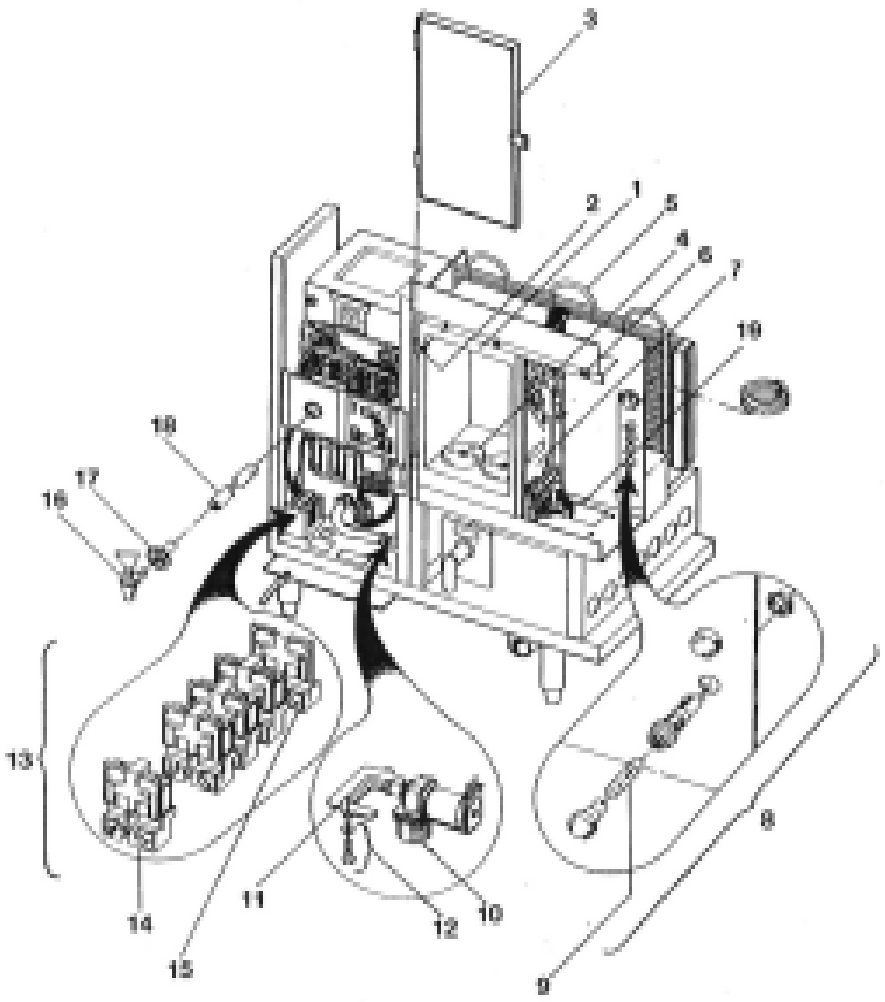
No.	Qty	Part No.	Description
01	1	BF7C	Draw-off assembly w. bracket, trim plate, grommet (complete)
02	2	3718	Knurled screw assembly
03	1	BF7	Draw-off piping with bracket
04	1	RG1	Grommet, draw-off trim pipe
05	1	DE0036	Plate with clamp, draw-off assembly trim
06	1	BF8C	Draw-off extension assembly
07	1	BF8	Adapter for draw-off extension
08	1	K010620	Hose for draw-off extension
09	2	2P182	Fitting, back-flow preventer; 1/2” pipe, 3/8” flare
10	2	4A810	Back-flow preventer, Watts 9D, 1/2”
11	1	3P876	Nipple, back-flow union, 1/2” w/hex.
N/S	1	91316	Screw, 8-32 x 1/2 S/S, trim plate clamp



No.	Qty	Part No.	Description
01	2	BF1A	Nut, transition fitting
02	2	BF1	Fitting, hose to valve transition
03	2	A0208	O Ring, transition fitting/outlet valve
04	2	G0702	Plunger, water outlet
05	2	A0218	Gasket, water outlet plunger
06	2	G2762	Valve body, water outlet, 9.5mm
07	2	F0151	Coil, water outlet valve
08	2	G0798	Ring, knurled, coil holding
09	2	A0264	Clip, outlet elbow retaining 22
10	2	D0570	Amp plug, 2-pin male 350777-1
10	4	D0564	Amp pin, male 350690-1
11	2	A0559	Circlip, coil retaining
12	2	D0038S1	Hose, oulet valve seal 5mm
13	2	A0519	Elbow, water valve outlet
14	2	D0025S4	Hose, outlet valve/trough inlet 55mm
15	4	A0385	Clamp, 20mm, tank to outlet fitting hose
16	1	D0025S7	Hose, tank/outlet fitting right 320mm
16	1	D0025S8	Hose, tank/outlet fitting left 320mm
17	4	A0385	Clamp, 20mm, tank to outlet fitting hose
18	1	G3100	Gasket, vibration, 80mm
19	1	F0709	Thermostat, cooling, with knob and nut
20	1	3433	Grommet, support shelf/compressor harness
21	1	DE0025	Support shelf, valve mounting
22	1	10x6454	Harness, main control
24	4	A0040	Screw, 5 x 10mm, trough inlet mounting
24	2	B7499	Trough inlet
25	1	D0001S2	Insulation, coil wires left 400mm
25	1	D0001S3	Insulation, coil wires right 360mm AWG6
26	1	30321R	Fuse holder, branch circuit, Gould 30321 R
26	1	ATMR15	Fuse, 15 A, branch circuit, Gould ATMR15
26	1	FH1	Fuse holder jumper harness
N/S	1	2W376	Cable, 1413 SOW-A, 25" for cooling compressor
N/S	2	D0244	Terminal, 114 quick connect for cooling compressor
N/S	2	D0245	Insulator, 1/4 Q.C. terminal for cooling compressor
N/S	1	17027	Clamp, nylon 318, wire bundle, comprsr cable mtg.
N/S	1	5811	Ring terminal, compressor ground
N/S	1	7061	Nut, hex, 8-32 SIS, compressor cable mounting
N/S	1	7061	Nut, hex, 8-32 SIS, compressor ground
N/S	1	91316	Screw, 8-32 x 112 SIS, compressor cable mounting
N/S	1	91316	Screw, 8-32 x 112 SIS, compressor ground
N/S	1	94457	Lock washer, #8, 410 SIS, compressor cable mtg.
N/S	1	96073	Clamp, Nylon 9/16, main harness wire bundle
N/S	1	CCC01	Cable, compressor power connection - complete
N/S	1	D0570	Amp plug, 2-pin male 350777-1 for compressor cable
N/S	1	LAB15	Label, FOR CONTINUED PROTECTION, silver
N/S	2	94457	Lock washer, #8, 410 S/S, compressor ground
N/S	2	D0573	Amp pin, male 350552-1 for compressor cable
N/S	8	17032	Clamp, nylon 314, wire bundle
N/S	8	91335	Screw, 10-32 x 112 SIS, clamp mounting

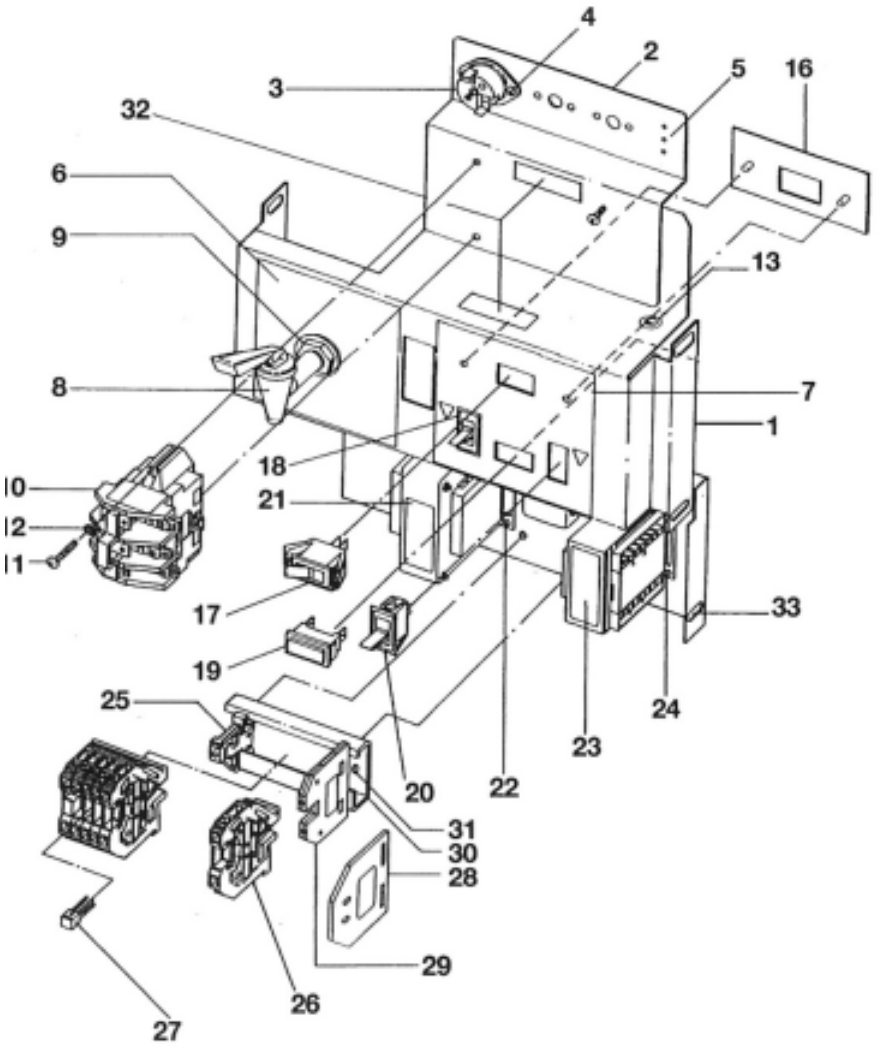


No.	Qty	Part No.	Description
01	1	DE0011	Tank, water, without components
02	1	DE0014	Cover, water tank
03	8	91316	Screw, 8-32 x 1/2 SIS, tank cover mounting
04	1	G0764	Wire, float
05	3	G2747	Float piece
06	1	D0675	Float switch
	1	G2908	Float switch with harness
07	2	A001 6	Screw, 3 x 25mm, float switch mounting
08	2	A01 30	Washer, 3.2mm, float switch mounting
09	2	A01 35	Lock washer, 3.2mm, float switch mounting
10	2	A0101	Nut, 3mm, float switch mounting
11	1	BF5	Pipe, water level overflow w/t-handle
12	1	5091	Elbow, tank drain with sleeve and nut
13	2	F0705	Thermostat, heating or lockout
14	2	BF3	Tube, thermostat capillary placement
15	2	91316	Screw, 8-32 x 1/2 S/S, cap tube retainer
16	2	A0648	Gasket, fitting
17	2	A0638	Washer, fitting
18	2	BF3A	Nut, tube
19	1	5090	Elbow, inlet water stream directing
20	2	81834	Plug bolt, 7116-14 x 1, 316 SIS
21	2	81571	Gasket, copper, plug bolt
22	2	81870	Nut, 7116-14, 316 S/S, for plug bolt
23	1	BF2	Plug, element hole
24	1	4164x5764	Gasket, heating element
	1	BF2A	Nut, for BF2 plug
25	1	96860	Fitting, 318 ID x 1/2 mpt faucet to tank
26	1	96862	Fitting, inlet hose to water tank
27	2	A0751	Clamp, 18mm, inlet hose
28	1	D0014S6	Hose, inlet valve/tank fitting, 180mm
29	2	A0751	Clamp, 18mm, inlet hose
30	3	Cl 771 -1	Element, heating 6 kw, Model SCR
	6	11 9A677-2	Nut, heating element
	6	150-102	Screw, heating element elect. connection
	6	4164X5764	Gasket, heating element
31	1	5275	Plug, 1/2 npt, right side outlet
32	3	91335	Screw, 10-32 x 112 S/S, water tank mounting
	3	94458	Lock washer, #10, 410 S/S, water tank mounting
33	2	BF1	Fitting, hose to valve transition
34	2	A0648	Gasket, fitting
35	2	A0638	Washer, fitting
36	2	BF1A	Nut, transition fitting
N/S		K0085	Grease, heat transfer (1 ml per thermostat)
N/S	1	LAB4	Label, thermostat identification, black
N/S	1	LAB7	Label, CAUTION HOT SURFACE, red
N/S	5	A0295,	Clip, limit thermostat cap tube mounting

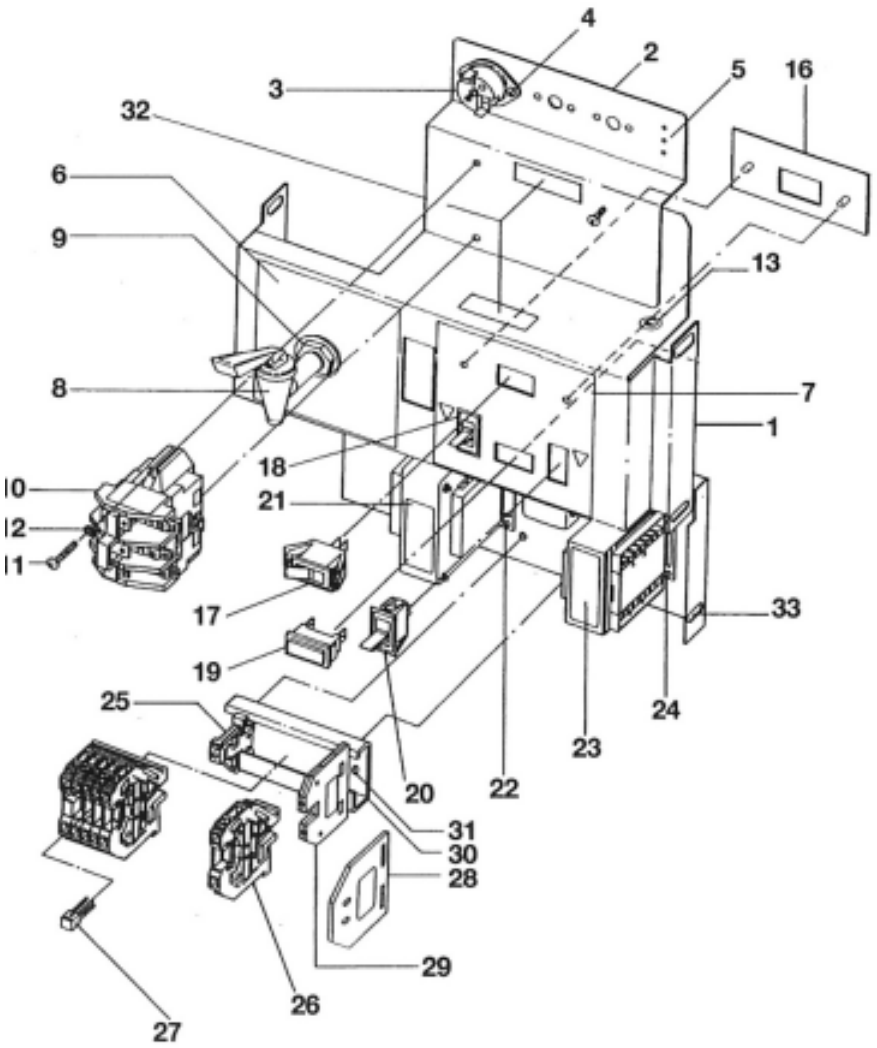


No.	Qty	Part No.	Description
01	1	G0373	Cooling compartment
02	4	A0073	Screw, 3,5 x 16 mm tapping, compartment mounting
03	1	G0363	Door, cooling compartment
04		A0169	Screw, 4 mm tapping S/S, coil cover
		A0285	O-ring, carrier/coil seal
		A0319	Plug, cover screw seal
		B7466	Housing, product dispense coil
		B7467	Cover, product dispense coil
		F0767	Coil, only, product dispense
		G0463	Carrier assembly, photo transmitter/receiver
	2	B7465	Damper, product coil bottom seal
	2	D0002S5	Insulation, product coil wires 930 mm 3/8
	2	G0453	Coil assembly, product dispense
05	1	F0477	Cooling unit complete
	4	81874	Washer, 1/4, S/S, compressor mounting
	4	91008	Bolt, hex, 1/4-20 x 1, S/S, compressor mounting
	4	92315	Spacer, threaded 6-32 x 1", condenser mounting
	8	91307	Screw, 6-32 x 3/8 S/S, condenser mounting
	8	94453	Lock washer, #6, 410 S/S, condenser mounting
06		D0431	Overnight switch
	1	SA1	Switch assembly with harness and cable assembly C
07	1	H2276HV	Circuit board, base/interconnection
	6	94225	Nut, 4-40 nylon, base board mounting
	8	92420	Spacer, 4-40 nylon, base board mounting
08	4	D0442	Fuse holder with cap and nut
09	2	D0666	Fuse, 3.15A
10	1	A0615	Wing nut, inlet adapter
	1	A0616	Gasket, inlet adapter
	1	F0169	Valve, inlet (restricter must be removed)
	1	G5095	Adapter, inlet
11	1	G0856	Flange, inlet valve mounting
12	2	A0671	Screw, hex, 4.2 x 13 mm, flange mounting
14	2	91316	Screw, 8-32 x 1/2 S/S, term block mounting
	2	94457	Lock washer, #8, 410 S/S, term block mounting
	4	824	Terminal, main (req. 4 pcs per block)
15	1	830	End cap, main (req. 1 pce per block)
16	1	PSC-BR-8	Faucet assembly, PSC-BR-8/176-14, 173PSSR-1
17	1	BF6	Bushing, 1/4 x 1/2, faucet assembly mounting
	1	BF6A	Washer, decorative, faucet assembly mounting
	1	BF6B	Nut, faucet assembly mounting
18	1	D0038S2	Hose, tomlinson 128 mm
	2	94609	Wire tie, 4"
19	4	94901	Grommet, continuous, insulaing 55 mm
N/S		F0157	Diaphragm, inlet valve
N/S		F0319	Kit, rebuild, inlet valve
N/S	1	3128	Fuse 2A, Littelfuse AGC2
N/S	1	91316	Screw, 8-32 x 1/2 S/S, latch plate mounting
N/S	1	D0664	Fuse, 1A
N/S	1	G0376	Latch plate for cooling compartment door
N/S	1	G2239	Spring, flat, latch plate reinforcement
N/S	3	94609	Wire tie, 4"

Section 5 Power pack components, Front panel switches, LED display PCB

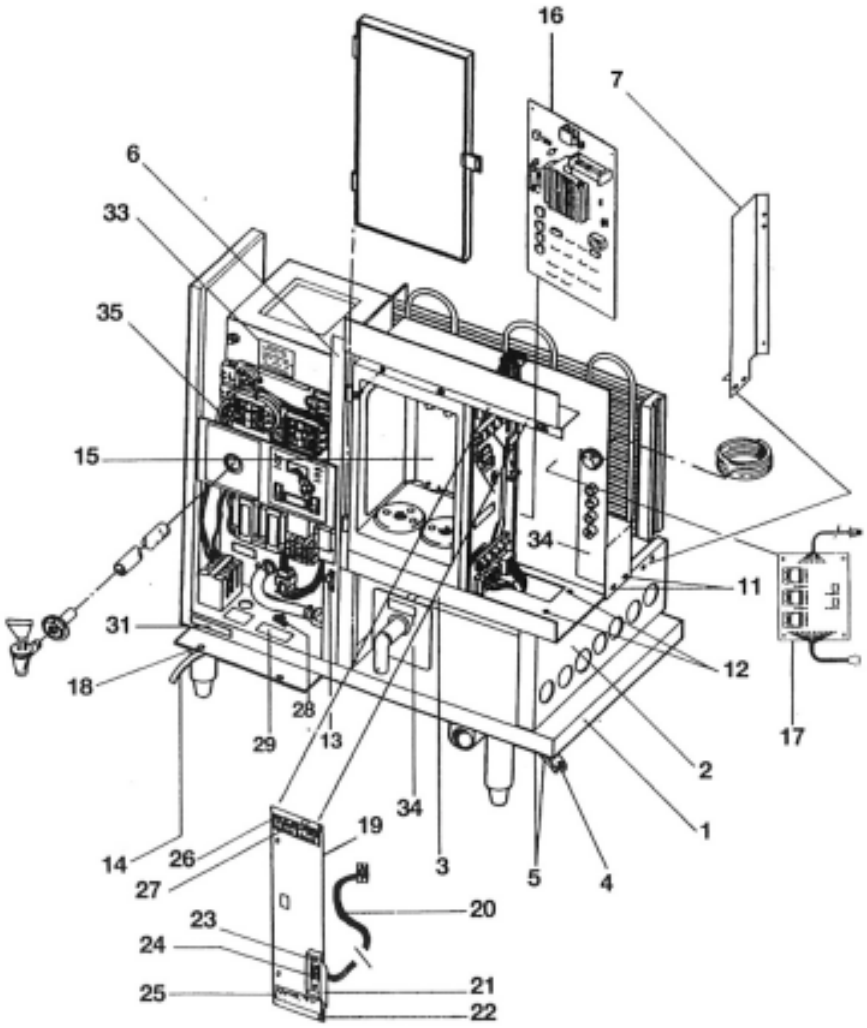


No.	Qty	Part No.	Description
01	1	DE0016	Chassis weldment, power supply base
02		DE0018	Chassis, upper, temperature limiter mounting
	2	17025	Clamp, nylon 114, wire bundle (pg 6, step 14)
	2	7061	Nut, hex, 8-32 SIS, clamp mounting
	2	91316	Screw, 8-32 x 1/2 SIS, clamp mounting
	2	94457	Lock washer, #8, 410 SIS, clamp mounting
03	1	F0702	Thermostat, safety/high temp limit
04	2	7060	Nut, hex, 6-332 SIS, limit thermostat mounting
	2	91306	Screw, 6-32 x 1/4 SIS, limit thermostat mounting
	2	94453	Lock washer, #6, 410 SIS, limit thermostat mounting 3
05	1	D0973	Terminal block, heating control circuit (TB2) 32
	1	E0091	Filter, suppression, inlet valve/contactor
	2	D0247	Insulation, wire
06	1	LAI32	Label, decorative, water faucet panel, black
07	1	DE0031	Dispense switch mounting plate for DE0016
	1	LA133	Label, decorative, operation panel, black
08	1	PSC-BR-8	Faucet assembly, PSC-BR-81176-14,173PSSR-1
09	1	BF6	Bushing, 1/4 x 1/2 faucet assembly mounting
10	2	41	NB30AJ70 Contactor, heating, Furnas 41 NB30AJ7OM
11	4	91338	Screw, 10-32 x 1 SIS, contactor mounting
12	4	84233	Lock washer, #10, split, contactor mounting
13	2	3431	Grommet, chassis/control wires
16	1	10X6455	Circuit board, LED display with harness
	1	10X6455A	Insulator, for LED display board
17		0582	Select switch used for 1 0x6455
18		0584	Stop switch used for 1 0x6455
19		LA28	Lamp, pilot used for 10x6455
20		0585	Start switch used for 10x6455
21	2	F0614	Transformer, 120W24V 3.2A
22	8	7060	Nut, hex, 6-32 SIS, transformer mounting 12
	8	91307	Screw, 6-32 x 318 SIS, transformer mounting
	8	94453	Lock washer, #6, 410 SIS, transformer mounting
23	1	F0387	Transformer, 120W1 3V 4.OA
24	2	A0389	Nut, spring type, BG 4.2, transformer mounting
	2	A0671	Screw, hex head, tapping, 4.2 x 13 mm, trans. mtg.
25	1	D0214	End piece, terminal block (TB3)
26	6	D0940	Terminal wafer (TB3)
27	2	D0942	Plate, bridge, terminal wafer interconnect (TB3)
28	1	D0941	Plate, insulator, terminal wafer (TB3)
29	1	D0909	Terminal wafer, EMI filter ground (TB3)
30	1	H0076	Rail, terminal carrier
31	2	7060	Nut, hex, 6-32 SIS, rail mounting
	2	91307	Screw, 6-32 x 318 SIS, rail mounting
	2	94453	Lock washer, #6, 410 SIS, rail mounting
32	1	LA136	Label, CAUTION HIGH VOLTAGE, red
33	5	91335	Screw, 10-32 x 112 SIS, power chassis mounting.
	5	94458	Lock washer, #10, 410 SIS, power chassis mtg.

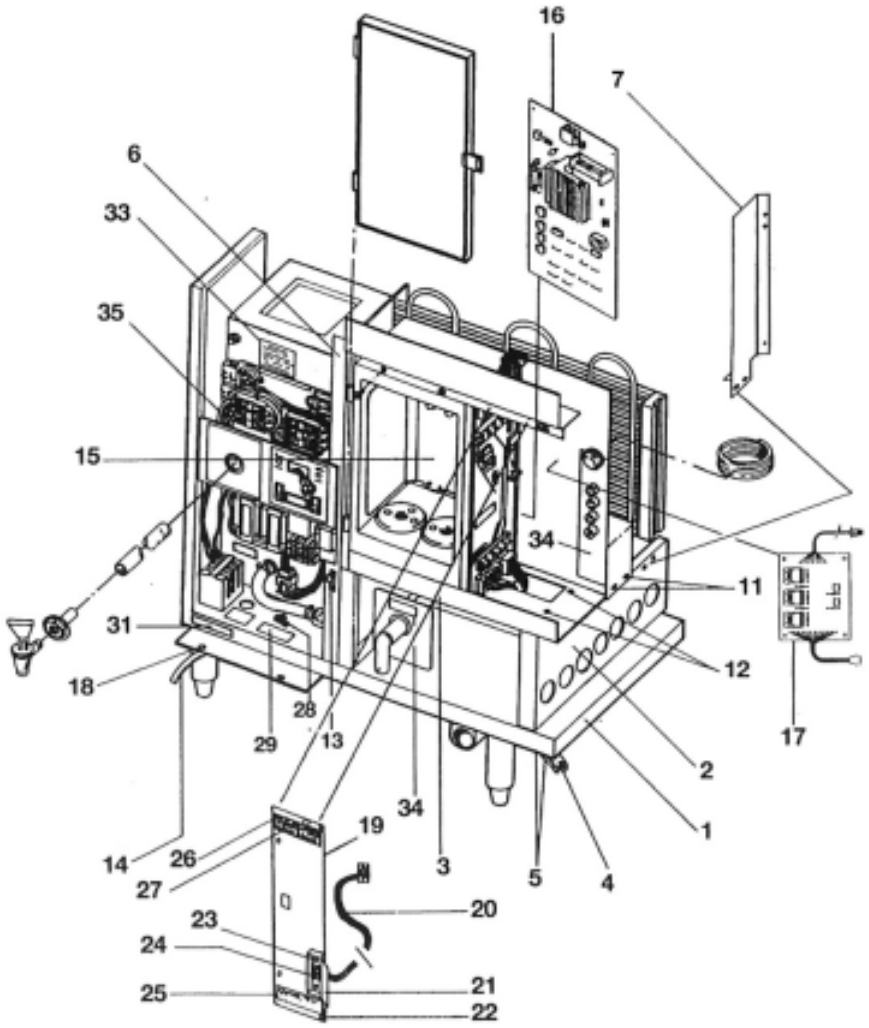


N/S	1	315005	Fuse, 5.00 A, pigtail
N/S	1	D0258	Terminal, double blade
N/S	1	LA28	Lamp, auxiliary 27
N/S	2	91316	Screw, 8-32 x 1/2 SIS, rectifier mounting
N/S	2	E0176	Rectifier
N/S	3	FIT221	Tubing, 318 x 2-112 heat shrink, fuse cover
N/S	4	94609	Wire tie, 4 inch
N/S	9	D0244	Terminal, 1/4 quick connect
N/S	9	D0245	Insulator, 114 Q.C. terminal
N/S	11	94609	Wire tie, 4 inch

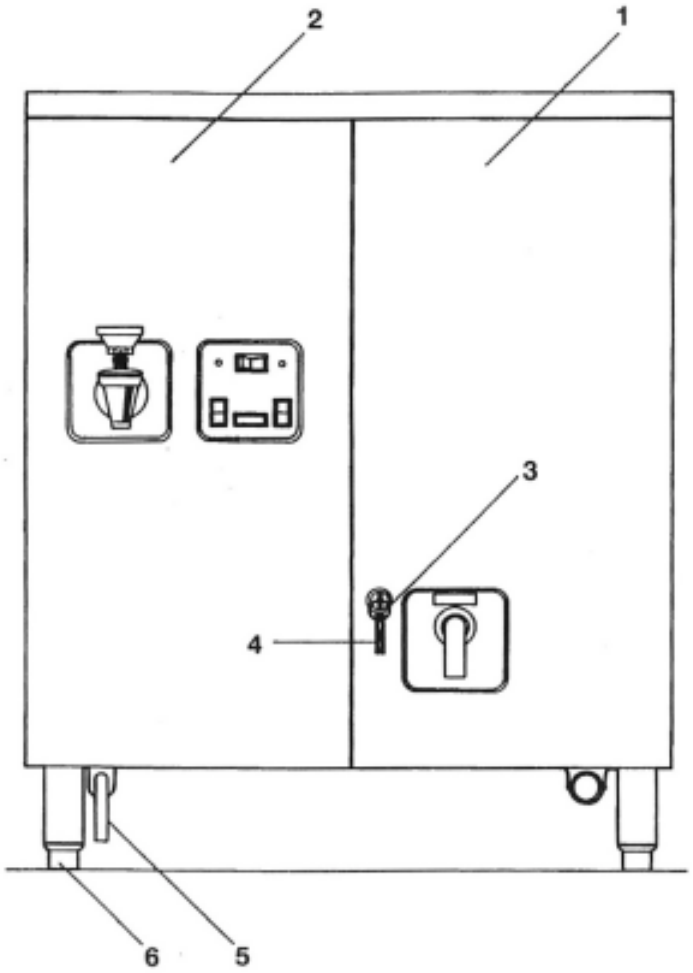
Section 6 Main chassis, Relay PCB, Microprocessor PCB, PCB Acess cover, Programming extension cable, Labels, Element Harness



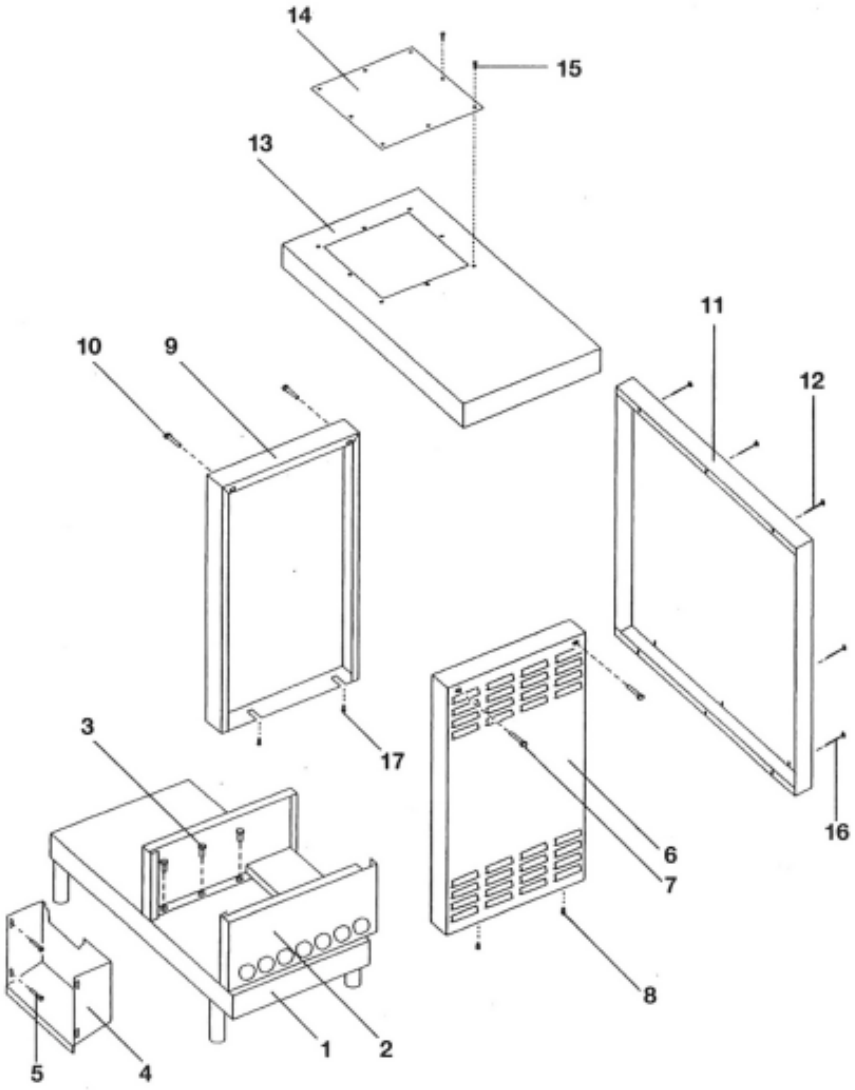
No.	Qty	Part No.	Description
01	1	DE0019	Main base plate, weldment
02	1	DE0023	Sub base, right side, compressor mounting weldment
03	1	DE0027	Frame assembly, cooling compartment mounting
04	1	DE0024	Bracket, main door lower hinge
05	2	91006	Bolt, hex, 1/4-20 x 1/2, 18-8 SIS, hinge bracket mtg.
	2	94470	Lock washer, 1/4, 410 SIS, hinge bracket mounting
06	1	91306	Screw 6-32 x 1/4 SIS, cover mounting
	1	94453	Lock washer, #6, 410 SIS, cover mounting
	1	94901	Grommet, continuous, 7" (Pg. 8, Step 25)
	1	DE0026	Cover, protective, vertical
07	1	DE0022	Support bracket, condenser mounting
11	4	7060	Nut, hex, 6-32 S/S, support shelf mounting
	4	91306	Screw, 6-32 x 1/4 S/S, support shelf mounting
	4	94453	Lock washer, #6, 410 S/S support shelf mounting
12	4	7061	Nut, hex 8-32 S/S, frame assembly mounting
	4	91316	Screw, 8-32 x 1/2 S/S, frame assembly mounting
	4	94457	Lock washer, #8, 410 S/S frame assembly mounting
13	1	DE0021	Latch plate, main door lock
	2	7060	Nut, hex, 6-32 S/S, latch plate mounting
	2	91306	Screw, 6-32 x 1/4 S/S, latch plate mounting
	2	94466	Lock washer, #6, 410 S/S, latch plate mounting
14	1	BF4	Tubing, drain/overflow
15	1	H2250	Plate, evaporator
	2	A0026	Screw, 4-.70 x 10mm, retaining plate mounting
	2	A0073	Screw, 3.5 x 16mm tapping, evaporator mounting
16	1	H2293HV	Circuit board, microprocessor
17	1	10X6453	Circuit board, relay with harness
	4	91302	Screw, 4-40 x 1/2 S/S, relay board mounting
	4	92420	Spacer, 4-40 nylon, relay board mounting
	4	94225	Nut, 4-40 nylon, relay board mounting
18	2	91006	Bolt, hex, 1/4, 20 x 112, 18-8 S/S, left panel mounting
	2	94470	Lock washer, 1/4 410 S/S, left panel mounting
19	1	DE0028	Cover, printed circuit board compartment
20	1	SD0001	Cable, programming extension, 24"
21	1	34	Cover, programming plug
22	4	91307	Screw, 6-32 x 3/8 S/S, PCB compartment cover mtg.
23	2	7060	Nut, hex, 6-32 S/S, programming plug cover mtg.
	2	91306	Screw, 6-32 x 114 S/S, programming plug cover mtg.
	2	94453	Lock washer, #6, 410 S/S program'g plug cover mtg.
24	2	7059	Nut, hex 4-40 S/S, cable connector mounting
	2	91300	Screw, 4-40 x 114 S/S, cabie connector mounting
	2	94452	Lock washer, #4, 410 S/S, cable connector mounting



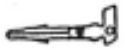
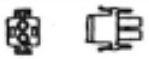
No.	Qty	Part No.	Description
25	1	LAB11	Label, NO USER SERVICEABLE, yellow
26	1	LAB9	Label ON - OFF, black
27	1	LAB16	Label, DISCONNECT POWER BEFORE SERVICING, clear
28	1	7063	Nut, hex, 10-24, S/S, ground terminal mounting
	1	94458	Lock washer, #10, 410 S/S, ground terminal mtg.
	1	SLU 35	Ground terminal 35 A ACE 30449
	1	SLU 70	Ground terminal 70 A ACE 30450
29	1	LAB8	Label, GROUND, green
31	1	LAB14	Label, DO NOT CONNECT LI, silver
33	1	LAB5	Label, SAFETY TEMP LIMIT, orange
34	1	LAB1	Label, SET - FUSE VALUES/CAUTION, black
	1	LAB10	Label, CAUTION HOT LIQUIDS, red, draw off assembly
	1	LAB12	Label, fuse rating warning, yellow
35	1	10x6456	Harness, element/high voltage wiring
	3	89255	Wire tie, 5-1/'2" (pg. 8, step 25)
N/S	1	91316	Screw, 8-32 X 1/2 S/S, positioning plate mounting
N/S	1	94467	Lock washer, #8, 410 S/S, positioning plate mounting
N/S	1	DE0030	Plate, positioning
N/S	1	DE0032	Bracket, capillary tube
N/S	1	G3100	Gasket, vibration 185mm
N/S	2	7062	Nut, hex 10-32 S/S, for door bumper
N/S	2	91338	Screw, 10-32 x 1 S/S for door bumper
N/S	2	RH10	Cap, plastic for door bumper
N/S	2	RHW103	Washer, cup for door bumper



No.	Qty	Part No.	Description
01	1	DE0007	Door, main cabinet
02	1	DE0008	Panel, left front cabinet
03	1	DL0001	Lock, main door with 2 keys
04	2	B1076	Key for lock, main door
05	1	BF4	Tubing, drain/overflow
06	4	1650 L	Locking ring for insert (Kason model 61650001000)
	4	1651 S/S	Foor insert (Kason model 61651000257)



No.	Qty	Part No.	Description
01	1	DE0019	Main base plate, weldment
02	1	DE0023	Sub base, right side, compressor mounting weldment
03	5	91006	Bolt, hex, 114-20 x 112, 18-8 S/S base mounting
	5	91385	Nut, acorn, 114-20, thread covering
	5	94460	Lock washer, 1/4, 410 S/S, base mounting
04	1	DE0029	Panel, inner splash
05	4	91307	Screw, 6-32 x 3/8 S/S, splash panel mounting 10 9
06	1	DE0006	Panel, right side, cabinet
07	7	91338	Screw, 10-32 x 1 S/S, top panel mounting
	7	94458	Lock washer, #10, 410 S/S, top panel mounting
08	2	91333	Screw, 10-32 x 1/4 S/S, side panelbase mounting
	2	94468	Lock washer, #10, 410 S/S, side panel mounting
09	1	DE0005	Panel, left side, cabinet
10	7	91338	Screw, 10-32 x 1 S/S, top panel mounting
	7	94458	Lock washer, #10, 410 SIS, top panel mounting
11	1	DE0009	Panel, rear, cabinet
12	2	91340	Screw, 10-32 x 1-1/2 S/S, rear panel mounting
	2	94468	Lock washer, #10, 410 S/S, rear panel mounting
	7	91338	Screw, 10-32 x 1 SIS, top panel mounting
	7	94458	Lock washer, #10, 410 S1S, top panel mounting
13	1	DE0010	Panel, top, cabinet 3
14	1	DE0015	Cover, top hatch 17
15	8	91316	Screw, 8-32 x 112 SIS top hatch mounting
16	3	91335	Screw, 10-32 x 1/2 S1S, rear panel mounting
	3	91384	Nut, acom, 10-32, rear panel mounting at base
	3	94468	Lock washer, #10, 410 S/S rear panel mounting
17	2	91333	Screw, 10-32 x 114 S/S, side/base mounting
	2	94468	Lock washer, #10, 410 S/S, side/base mounting
N/S	1	7062	Nut, hex, 10-32 S1S, side panel dummy hole
N/S	1	91335	Screw, 10-32 x 112 S/S, side panel dummy hole

DESCRIPTION	POS.	APPLICATION RANGE CABLE mm²	INSUL Ø mm	AWG
	01	0.2-0.8	2.5	24-18
	02			
	03	0.5-2.5	3.3	20-14
	04			
	05			
	06			
	07			
	08			
	09			
	10			

DESCRIPTION	POS.	APPLICATION RANGE CABLE mm²	INSUL Ø mm	AWG
	11			
	12			
	13			
	14			
	15			
	30	1.0-2.5	3.0-4.3	16-14
	31			
	35			
	36			

No. Qty Part No. Description

01 1 D-0564 Contact pin 0.2-0.8sqmm
02 1 D-0573 Contact pin 0.5-2.lsqmm
03 1 D-0562 Contact socket 0.2-0.8sqmm
04 1 D-0563 Contact socket 0.5-2.lsqmm
05 1 D-0586 Keying plug
06 1 D-0570 Plug housing, 2 pole
07 1 D-0571 Socket housing, 2 pole
08 1 D-0566 Plug housing, 3 pole
09 1 D-0565 Socket housing, 3 pole
10 1 D-0560 Plug housing, 6 pole

No. Qty Part No. Description

11 1 D-0561 Socket housing, 6 pole
12 1 D-0559 Plug housing, 12 pole
13 1 D-0569 Socket housing, 12 pole
14 1 D-0914 Plug housing, 15 pole
15 1 D-0975 Socket housing, 15 pole

30 1 D-0244 Flat connector 6.3 1-2.5sqmm
31 1 D-0245 Insulating sleeve 6.3mm

CONTACT EXTRACTOR

35 1 E-0687 Amp contact extractor
36 1 E-0688 Amp replacement tip

Contents

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Section 2	**Water heating system**	**4**
Section 3	**Concentrate empty detection**	**6**
Section 4	**Cooling system**	**8**
Section 5	**Power pack**	**10**
Section 6	**Dispense and low temperature lock-out circuit**	**13**
Front panel and Relay board schematic		**14**
Wiring diagram		**15**

GENERAL TROUBLESHOOTING GUIDELINES

A good quality volt ohm meter is required. The meter must have (at the minimum) ranges to read: 0 to 50 volts AC / 0 to 300 volts AC / 0 to 50 volts DC / 0 to 1000 ohms

All voltage readings are taken with all plugs plugged in and the overnight switch on, unless otherwise noted.

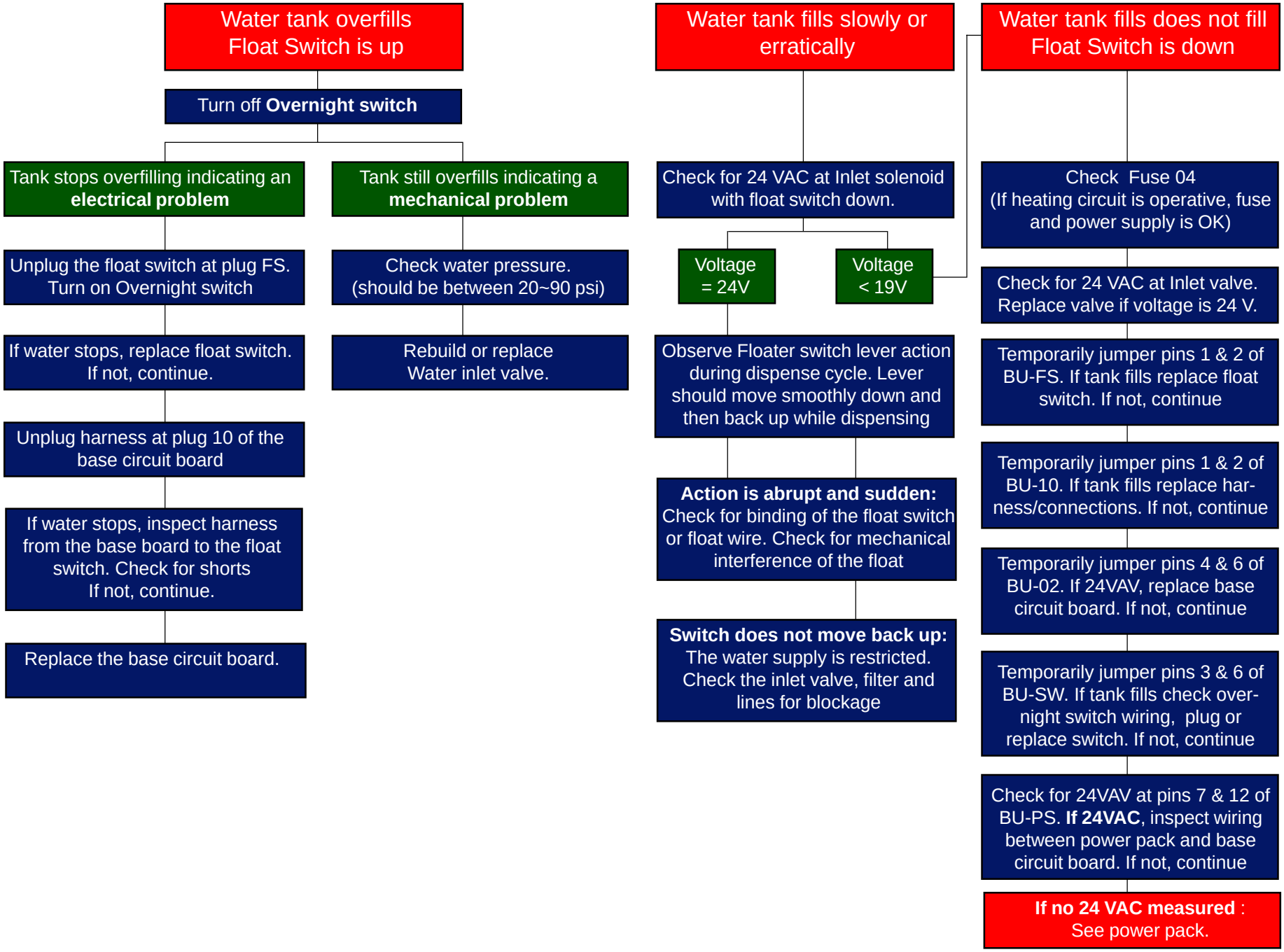
Never take resistance readings with power supplied to the dispenser.

When checking any of the low voltage control or dispense circuits, no voltage readings to the cabinet (ground) are of any value. No part of the control circuits are at ground potential, so any voltage you may read from any component to ground will be a transient voltage which has nothing to do with the operation of the dispenser.

The service device may be helpful in troubleshooting the dispense circuits, a problem which is usually identified by flashing of the red empty indicators. It will identify a problem with the water dispense circuits, concentrate dispense circuits and microprocessor board programming. It will not identify a problem in the cooling, heating or water inlet circuits.

When checking fuses, never assume that because a fuse looks good that it is good. If a fuse break at the very end, it will look intact but have no continuity.

Always check fuses with an ohm meter for continuity.

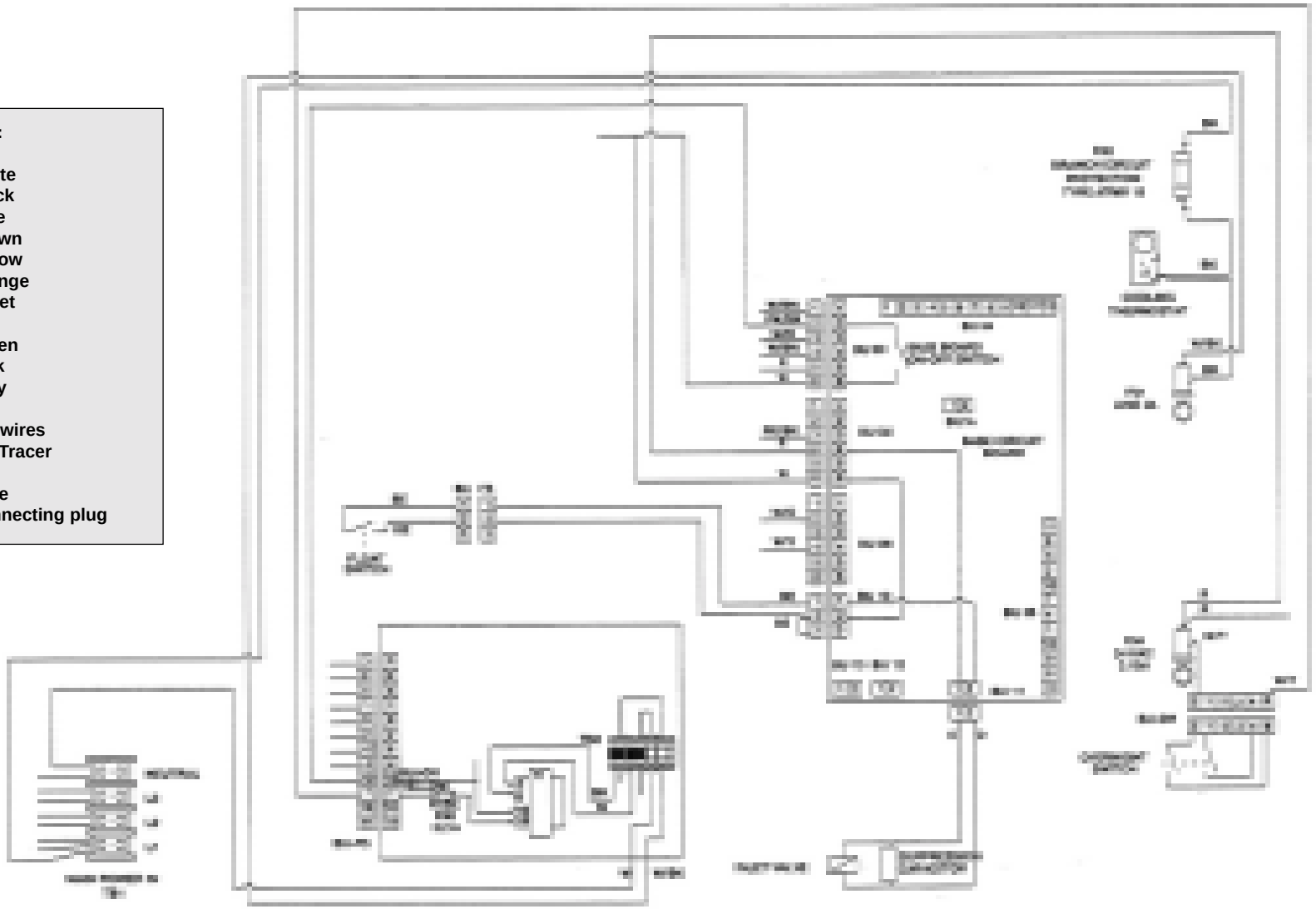

Water tank overfills
Float Switch is up
Turn off **Overnight switch**
Tank stops overfilling indicating an **electrical problem**
Tank still overfills indicating a **mechanical problem**
Unplug the float switch at plug FS. Turn on Overnight switch
Check water pressure. (should be between 20~90 psi)
If water stops, replace float switch. If not, continue.
Rebuild or replace Water inlet valve.
Unplug harness at plug 10 of the base circuit board
If water stops, inspect harness from the base board to the float switch. Check for shorts If not, continue.
Replace the base circuit board.
Water tank fills slowly or erratically
Check for 24 VAC at Inlet solenoid with float switch down.
Voltage = 24V
Voltage < 19V
Observe Floater switch lever action during dispense cycle. Lever should move smoothly down and then back up while dispensing
Action is abrupt and sudden: Check for binding of the float switch or float wire. Check for mechanical interference of the float
Switch does not move back up: The water supply is restricted. Check the inlet valve, filter and lines for blockage
Water tank fills does not fill
Float Switch is down
Check Fuse 04 (If heating circuit is operative, fuse and power supply is OK)
Check for 24 VAC at Inlet valve. Replace valve if voltage is 24 V.
Temporarily jumper pins 1 & 2 of BU-FS. If tank fills replace float switch. If not, continue
Temporarily jumper pins 1 & 2 of BU-10. If tank fills replace harness/connections. If not, continue
Temporarily jumper pins 4 & 6 of BU-02. If 24VAV, replace base circuit board. If not, continue
Temporarily jumper pins 3 & 6 of BU-SW. If tank fills check overnight switch wiring, plug or replace switch. If not, continue
Check for 24VAV at pins 7 & 12 of BU-PS. **If 24VAC**, inspect wiring between power pack and base circuit board. If not, continue
If no 24 VAC measured : See power pack.

Color code:

W =	White
BK =	Black
BE =	Blue
BN =	Brown
Y =	Yellow
O =	Orange
V =	Violet
R =	Red
G =	Green
PK =	Pink
GY =	Grey

Multi color wires
Main color/Tracer Color

F =	Fuse
BU =	Connecting plug



Water tank overheats

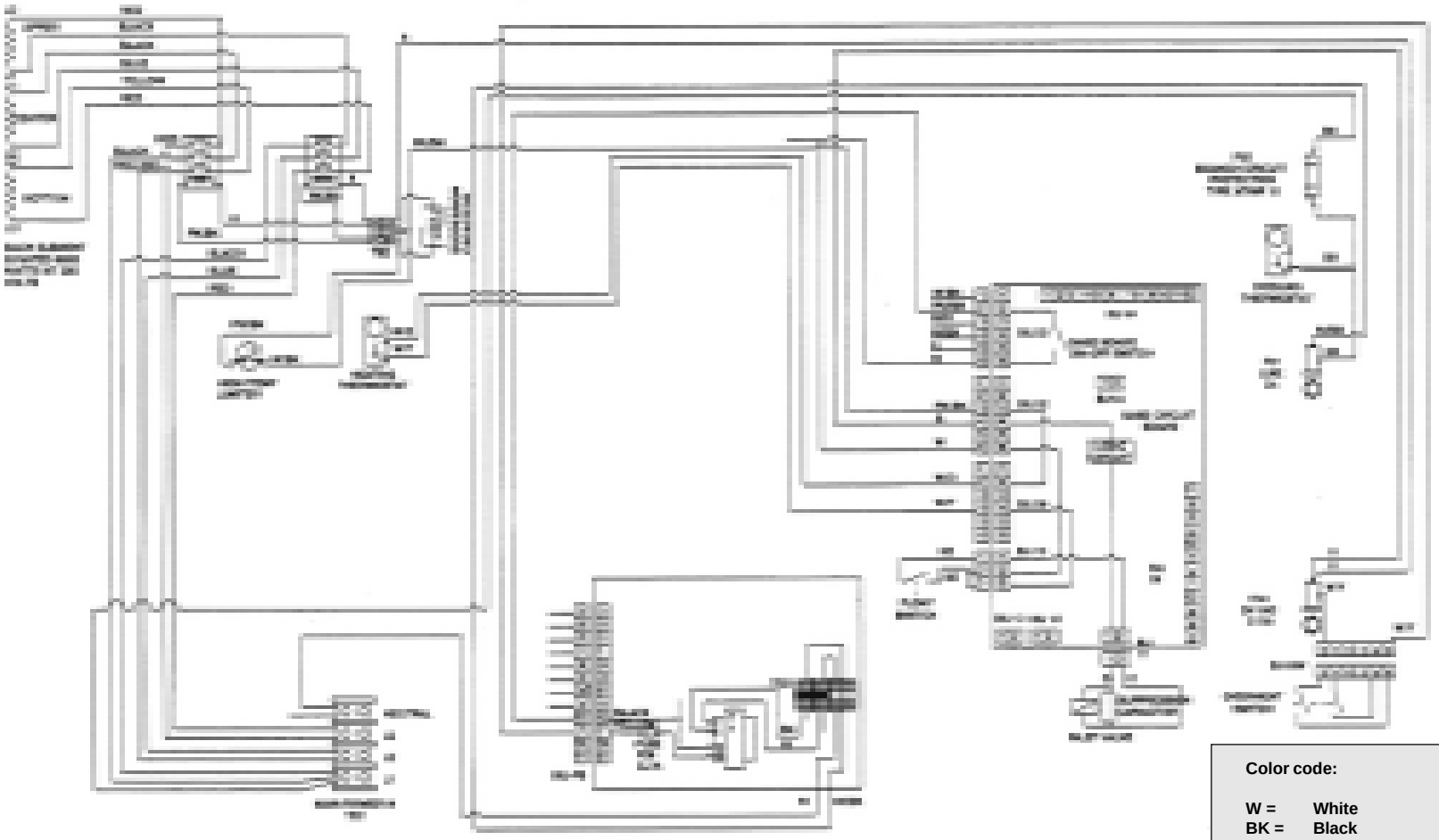
- Check the setting of the tank temp. thermostat. Adjust if necessary
- Disconnect power to dispenser. Make sure both heating contactors drop out. If not, replace stuck contactor(s). If they do drop out, continue
- While tank is overheating, disconnect 1 wire from the thermostat. If heating stops, replace the thermostat. If not, continue.
- Unplug BU-09. If heating stops, inspect wires from thermostat to plug BU-09 for shorts. If heating does not stop, continue.
- Unplug BU-02. If heating stops, inspect wires from BU-02 to terminal block TB3 for shorts. If OK, replace base circuit board.

Water tank does not heat at all

- Both contactors should be pulled in. If one is not, check for 24 VAC at the coil. If 24VAC is OK, replace contactor. If not, check wires between contactor coils. If both are not in, continue.
- Check fuse F04. Note: if water inlet circuit is operative, fuse and power supply are OK.
- Temporarily jumper pin 2 & 4 of BU-09. If contactors pull in, check the wires from BU-09 to the thermostat. If wires are OK, replace thermostat. If they do not pull in, continue.
- Temporarily jumper terminal 2 & 3 of terminal block TB2. If contactors pull in, check the high temp limiter. If connections are OK, replace limiter. If they do not pull in, continue.
- Temporarily jumper pin 3 & 6 of BU-SW If contactors pull in, check wiring of the overnight switch and plug. Replace if necessary. If contactors do not pull in, continue.
- Insert jumper between pin 2 & 3 of BU-10. Under certain conditions, contactors may not pull in if there is a problem with plug BU-10 connections.
- Check for 24VAC at pins 4 & 6 of BU-02. If 24VAV is OK, replace base circuit board. If not, continue.
- Check for 24VAC at pins 7 & 12 of BU-PS. If 24VAV is OK, inspect wiring between power supply and base board.
- If there is no 24VAC at pins 7 & 12 of BU-PS, refer to the **Power pack troubleshooting** section.

Water tank does not maintain correct temperature

- Check the incoming water temperature. Refer to the hourly capacity chart. The heating cicruit could appear to have a problem, but the cause is insufficient hot water supply to the dispenser, i.e. the customer is out-drawing the supply.
- Use an Amprobe to check the current of all 3 elements. Check the voltage at any element not pulling current. If there is no voltage at an element, check the connections and the contactors. The the voltage is OK, check the element for continuity. Replace any open element.
- Draw oof enough water to start a heating cycle. Just after the heating shuts off, take the temperature of the water. Repeat this a few times. If the dispense temperature is not consistent, replace the thermostat. If the problem is not corrected, replace the limiter.



Color code:

W =	White
BK =	Black
BE =	Blue
BN =	Brown
Y =	Yellow
O =	Orange
V =	Violet
R =	Red
G =	Green
PK =	Pink
GY =	Grey

Multi color wires
Main color/Tracer Color

F =	Fuse
BU =	Connecting plug

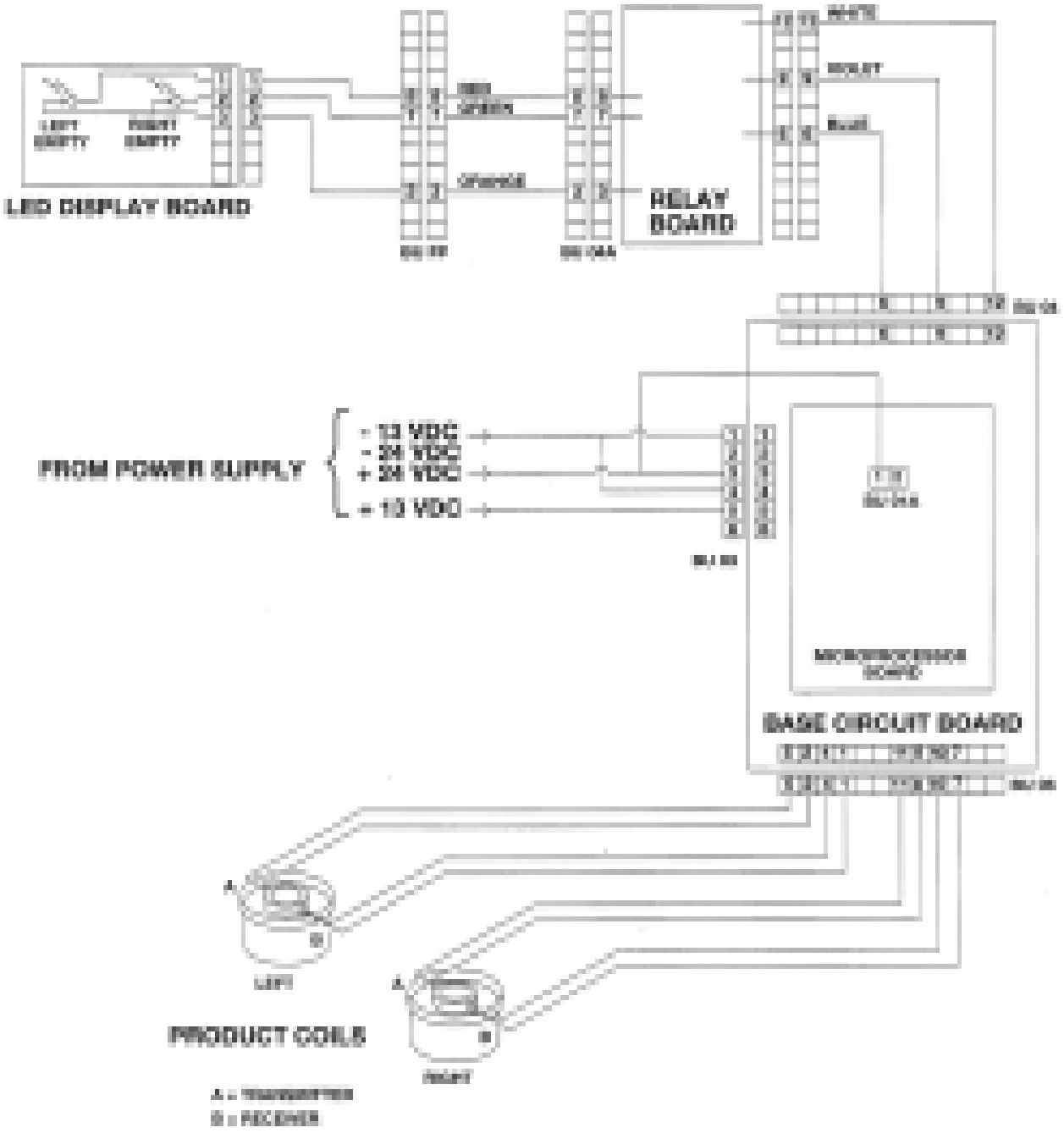
Section 3 Concentrate empty detection

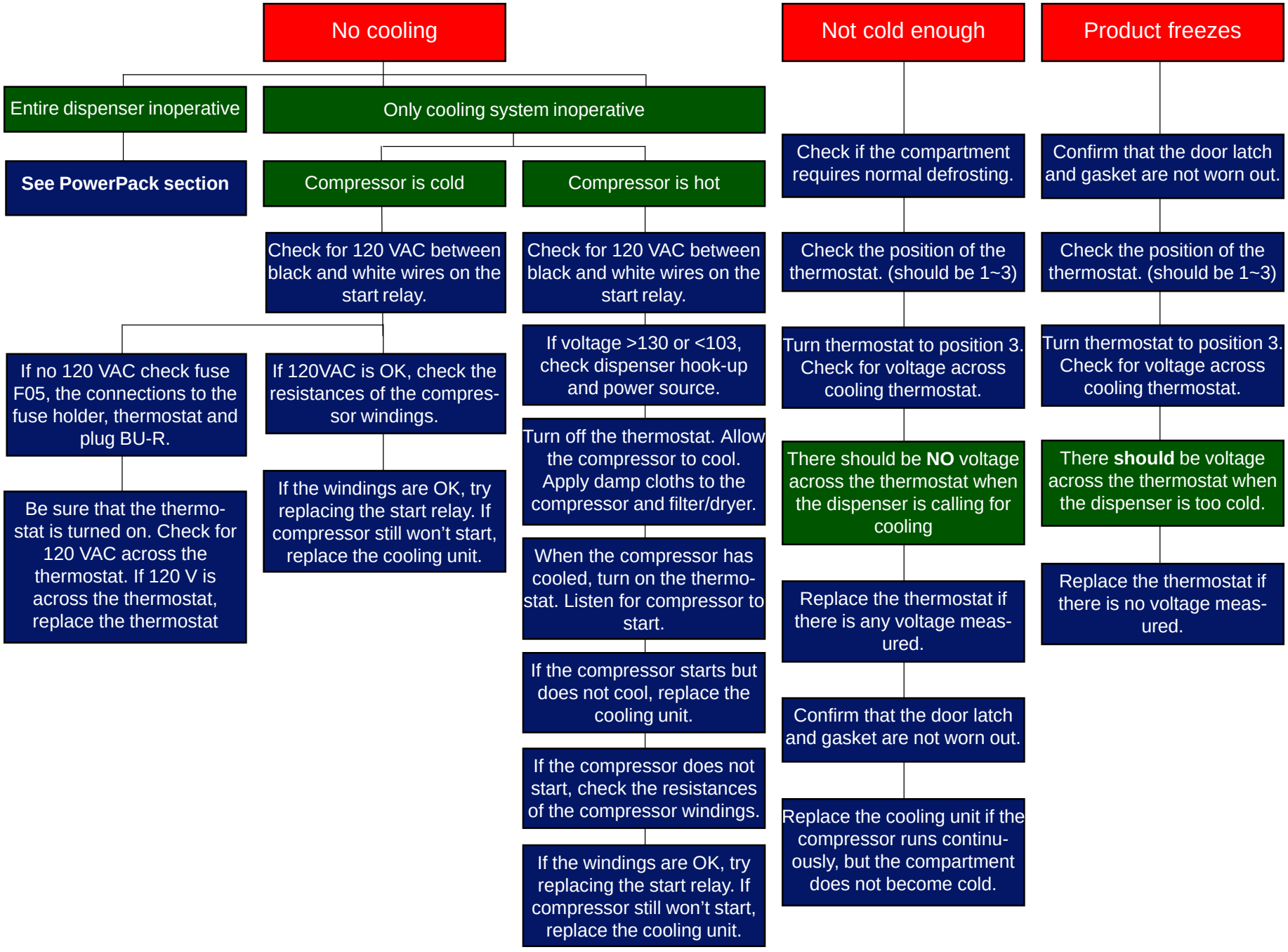
Empty light does not come on when product pack is empty

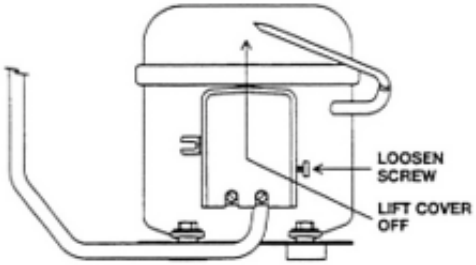
- Dispenser will dispense water from the handle of the empty side
  - Check BU-06 pin 8 & 11 (right side) or pin 2 & 5 (left side) for voltage (DC). If > 5 VDC, check plug connections. If connections are OK, replace coil assembly. If < VDC, replace the microprocessor. Replace the base board
    - With no obstruction in the hole of the coil assembly, check BU-06 pin 7 & 10 (right side) or pin 1 & 4 (left side) for voltage. If > 1 VDC, replace coil assembly. Replace microproces-sor. Replace Base board.
- Dispenser will not dispense water from the handle of the empty side
  - Check BU-04 pin 12 & 6 (right side) or pin 12 & 9 (left side) for voltage (DC). If > 5 VDC, check plug connections. If connections are OK, replace relay board. If < 1 VDC, replace the microprocessor.
    - Check BU-FP pin 3 & 7 (right side) or pin 3 & 8 (left side) for voltage (DC). If > 5 VDC, check plug connections. If connection are OK, replace LED display board. If < 1 VDC, replace the Relay board.

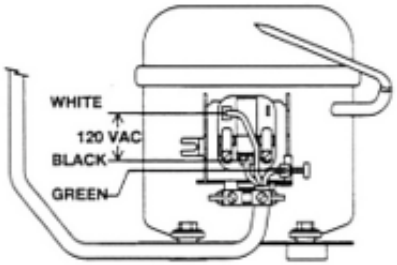
Empty light stays on when product pack contains concentrate

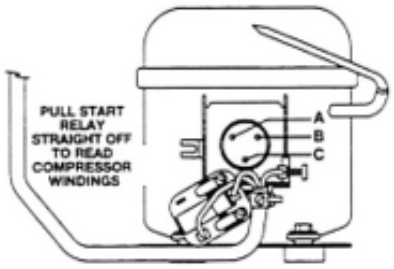
- Dispenser will dispense though the empty light is on
  - Unplug the microproc-essor. If the empty light goes out, replace the microprocessor. If the light does not go out, replace the relay board.
- Dispenser does not dispense and the empty light remains on
  - Inspect the product package and doser.
    - Clean the upper area of the hole in the product coil.
      - Unplug BU-06. If the empty light goes out, replace the appropriate (left or right) product coil assembly. If the empty light stays on, continue.
        - Unplug the micro-processor. If the empty light goes out, replace the micro-processor. product coil assembly. If the empty light stays on, replace the base board.


LED DISPLAY BOARD
RELAY BOARD
FROM POWER SUPPLY
+ 13 VDC
- 24 VDC
+ 24 VDC
+ 13 VDC
BASE CIRCUIT BOARD
PRODUCT COILS


No cooling
Entire dispenser inoperative
See PowerPack section
Only cooling system inoperative
Compressor is cold
Check for 120 VAC between black and white wires on the start relay.
If no 120 VAC check fuse F05, the connections to the fuse holder, thermostat and plug BU-R.
Be sure that the thermo-stat is turned on. Check for 120 VAC across the thermostat. If 120 V is across the thermostat, replace the thermostat
If 120VAC is OK, check the resistances of the compres-sor windings.
If the windings are OK, try replacing the start relay. If compressor still won't start, replace the cooling unit.
Compressor is hot
Check for 120 VAC between black and white wires on the start relay.
If voltage >130 or <103, check dispenser hook-up and power source.
Turn off the thermostat. Allow the compressor to cool. Apply damp cloths to the compressor and filter/dryer.
When the compressor has cooled, turn on the thermo-stat. Listen for compressor to start.
If the compressor starts but does not cool, replace the cooling unit.
If the compressor does not start, check the resistances of the compressor windings.
If the windings are OK, try replacing the start relay. If compressor still won't start, replace the cooling unit.
Not cold enough
Check if the compartment requires normal defrosting.
Check the position of the thermostat. (should be 1~3)
Turn thermostat to position 3. Check for voltage across cooling thermostat.
There should be NO voltage across the thermostat when the dispenser is calling for cooling
Replace the thermostat if there is any voltage meas-ured.
Confirm that the door latch and gasket are not worn out.
Replace the cooling unit if the compressor runs continu-ously, but the compartment does not become cold.
Product freezes
Confirm that the door latch and gasket are not worn out.
Check the position of the thermostat. (should be 1~3)
Turn thermostat to position 3. Check for voltage across cooling thermostat.
There should be voltage across the thermostat when the dispenser is too cold.
Replace the thermostat if there is no voltage meas-ured.

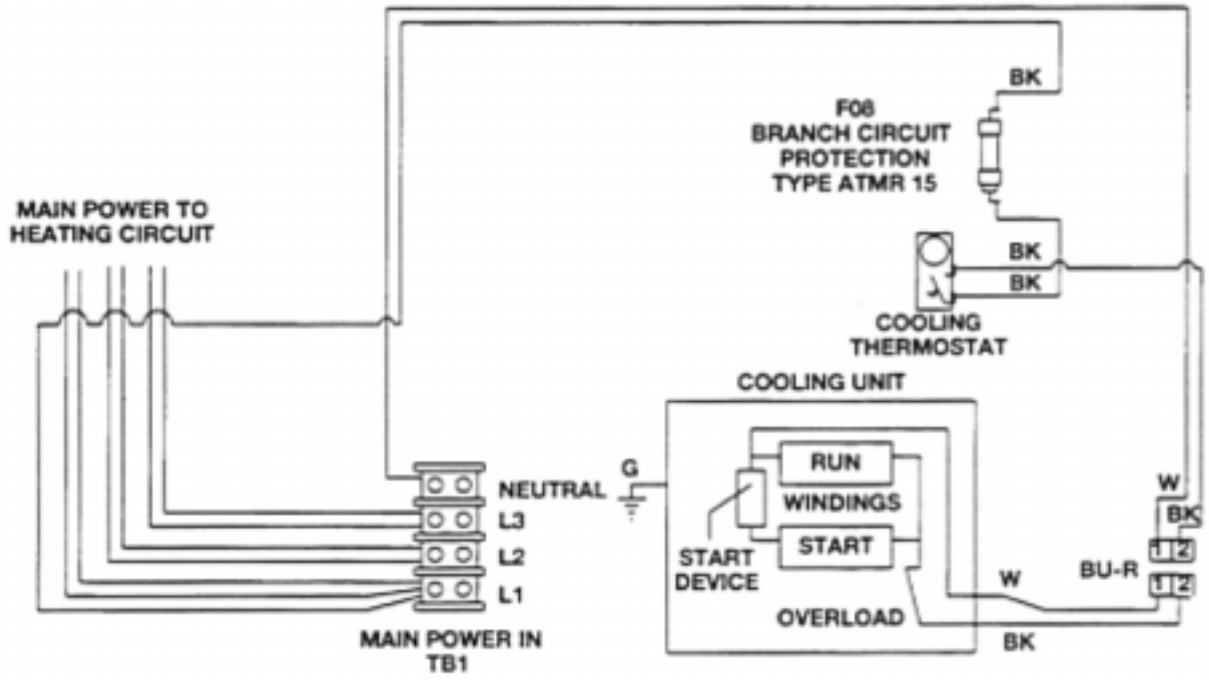


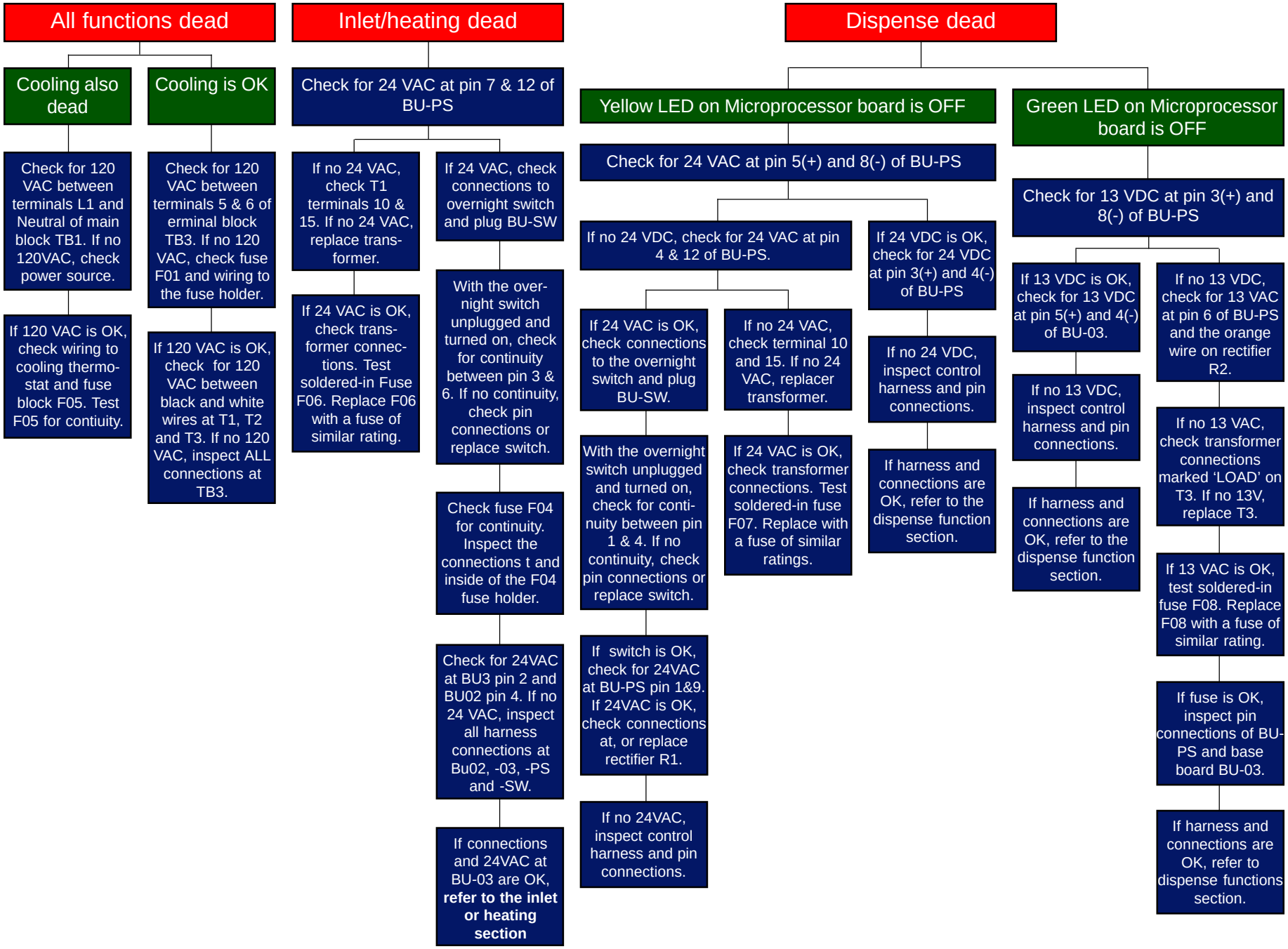


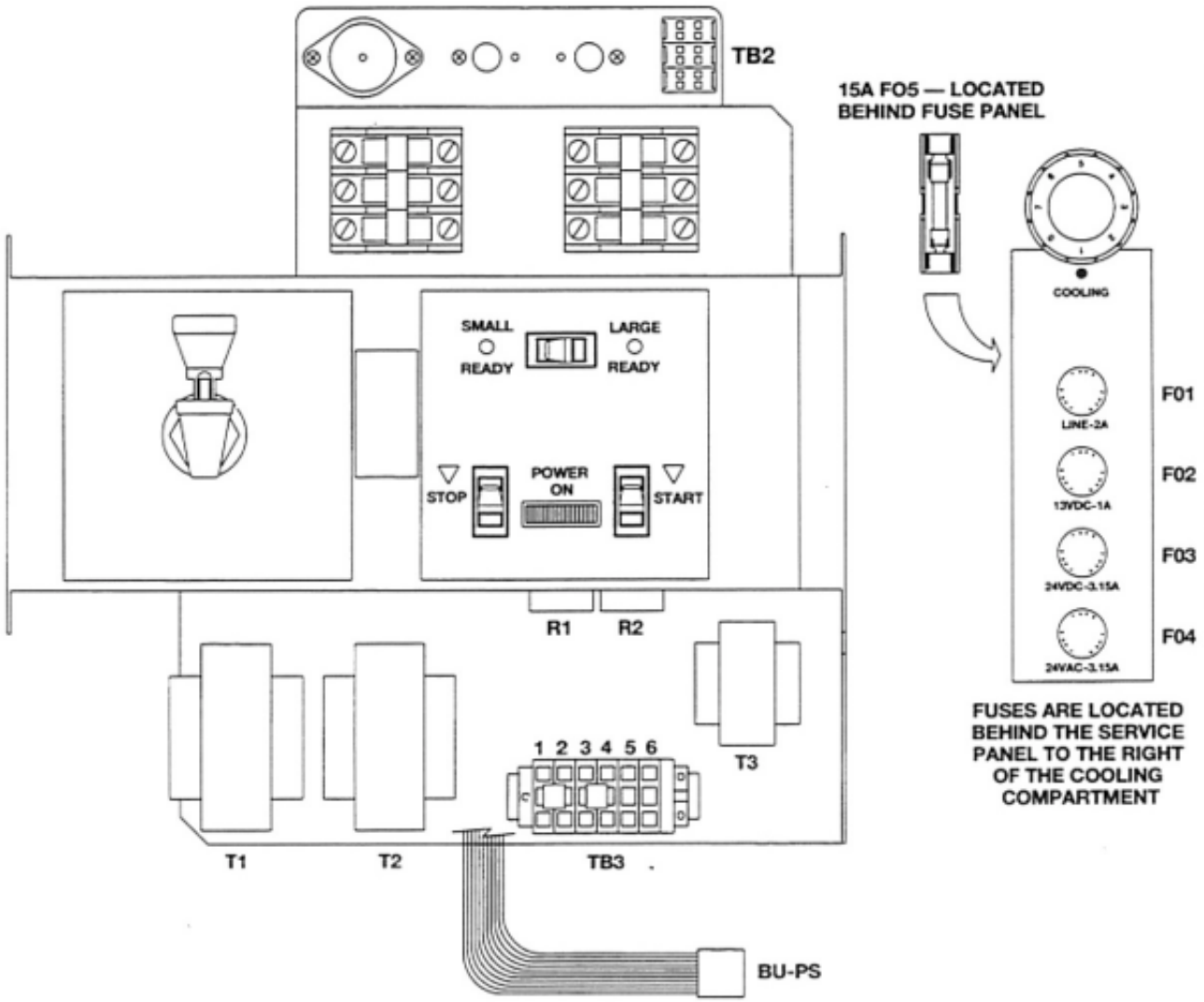


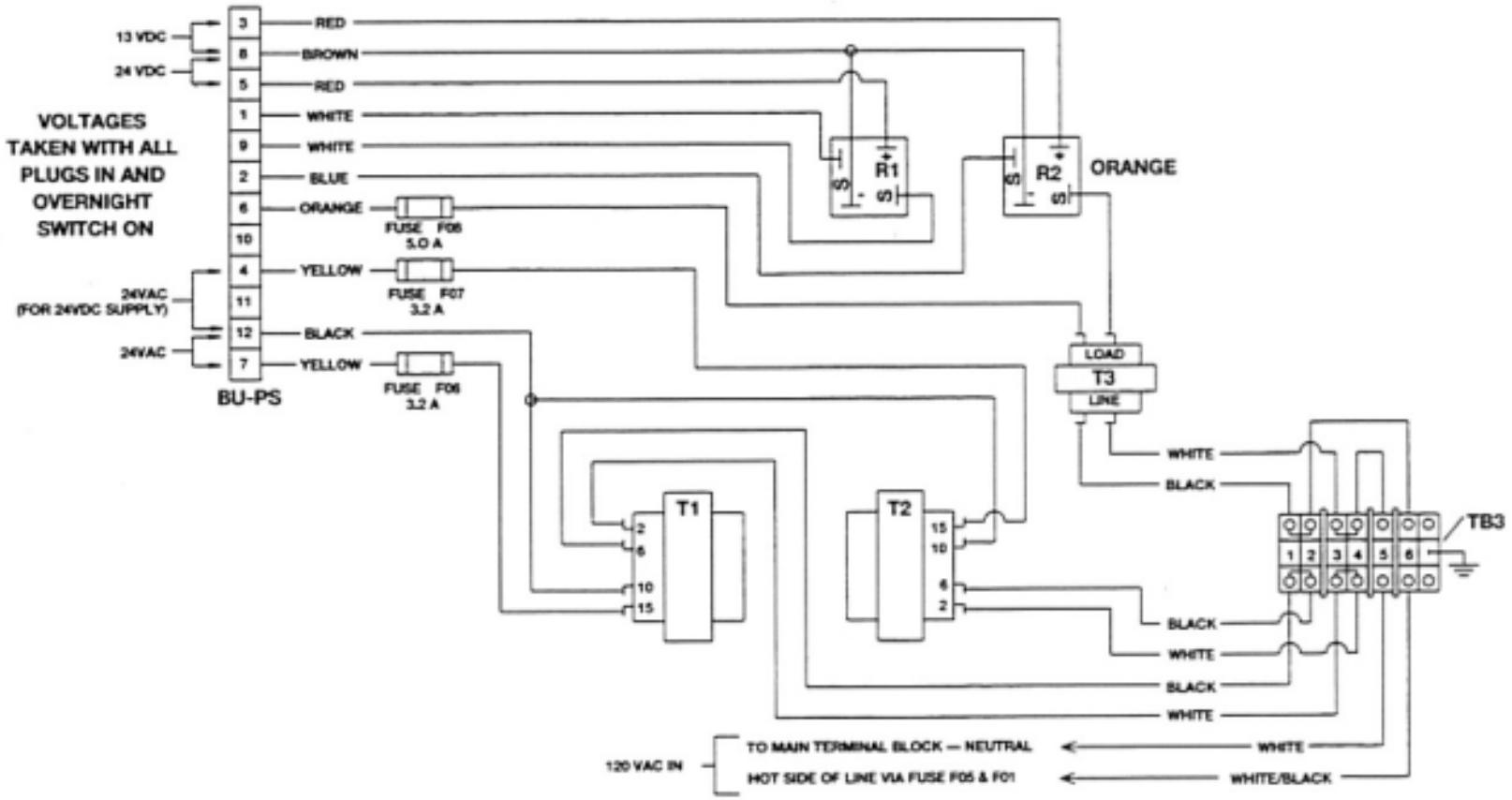
COMPRESSOR WINDING RESISTANCE

A - B	11 OHMS
A - C	6 OHMS
B - C	5 OHMS




All functions dead
Cooling also dead
Check for 120 VAC between terminals L1 and Neutral of main block TB1. If no 120VAC, check power source.
If 120 VAC is OK, check wiring to cooling thermo-stat and fuse block F05. Test F05 for contiuity.
Cooling is OK
Check for 120 VAC between terminals 5 & 6 of erminal block TB3. If no 120 VAC, check fuse F01 and wiring to the fuse holder.
If 120 VAC is OK, check for 120 VAC between black and white wires at T1, T2 and T3. If no 120 VAC, inspect ALL connections at TB3.
Inlet/heating dead
Check for 24 VAC at pin 7 & 12 of BU-PS
If no 24 VAC, check T1 terminals 10 & 15. If no 24 VAC, replace trans-former.
If 24 VAC is OK, check trans-former connec-tions. Test soldered-in Fuse F06. Replace F06 with a fuse of similar rating.
If 24 VAC, check connections to overnight switch and plug BU-SW
With the over-night switch unplugged and turned on, check for continuity between pin 3 & 6. If no continuity, check pin connections or replace switch.
Check fuse F04 for continuity. Inspect the connections t and inside of the F04 fuse holder.
Check for 24VAC at BU3 pin 2 and BU02 pin 4. If no 24 VAC, inspect all harness connections at Bu02, -03, -PS and -SW.
If connections and 24VAC at BU-03 are OK, refer to the inlet or heating section
Dispense dead
Yellow LED on Microprocessor board is OFF
Check for 24 VAC at pin 5(+) and 8(-) of BU-PS
If no 24 VDC, check for 24 VAC at pin 4 & 12 of BU-PS.
If 24 VAC is OK, check connections to the overnight switch and plug BU-SW.
With the overnight switch unplugged and turned on, check for conti-nuity between pin 1 & 4. If no continuity, check pin connections or replace switch.
If switch is OK, check for 24VAC at BU-PS pin 1&9. If 24VAC is OK, check connections at, or replace rectifier R1.
If no 24VAC, inspect control harness and pin connections.
If no 24 VAC, check terminal 10 and 15. If no 24 VAC, replacer transformer.
If 24 VAC is OK, check transformer connections. Test soldered-in fuse F07. Replace with a fuse of similar ratings.
If 24 VDC is OK, check for 24 VDC at pin 3(+) and 4(-) of BU-PS
If no 24 VDC, inspect control harness and pin connections.
If harness and connections are OK, refer to the dispense function section.
Green LED on Microprocessor board is OFF
Check for 13 VDC at pin 3(+) and 8(-) of BU-PS
If 13 VDC is OK, check for 13 VDC at pin 5(+) and 4(-) of BU-03.
If no 13 VDC, inspect control harness and pin connections.
If harness and connections are OK, refer to the dispense function section.
If no 13 VDC, check for 13 VAC at pin 6 of BU-PS and the orange wire on rectifier R2.
If no 13 VAC, check transformer connections marked 'LOAD' on T3. If no 13V, replace T3.
If 13 VAC is OK, test soldered-in fuse F08. Replace F08 with a fuse of similar rating.
If fuse is OK, inspect pin connections of BU-PS and base board BU-03.
If harness and connections are OK, refer to dispense functions section.


TB2
15A FO5 — LOCATED BEHIND FUSE PANEL
COOLING
F01
LINE-2A
F02
12VDC-1A
F03
24VDC-3.15A
F04
24VAC-3.15A
FUSES ARE LOCATED BEHIND THE SERVICE PANEL TO THE RIGHT OF THE COOLING COMPARTMENT
SMALL READY
LARGE READY
STOP
POWER ON
START
R1
R2
T3
1 2 3 4 5 6
T1
T2
TB3
BU-PS


13 VDC
24 VDC
VOLTAGES TAKEN WITH ALL PLUGS IN AND OVERNIGHT SWITCH ON
24VAC (FOR 24VDC SUPPLY)
24VAC
BU-PS
3
8
5
1
9
2
6
10
4
11
12
7
RED
BROWN
RED
WHITE
WHITE
BLUE
ORANGE
YELLOW
BLACK
YELLOW
FUSE F06 5.0 A
FUSE F07 3.2 A
FUSE F06 3.2 A
R1
R2
ORANGE
LOAD
T3
LINE
WHITE
BLACK
T1
T2
TB3
BLACK
WHITE
BLACK
WHITE
120 VAC IN
TO MAIN TERMINAL BLOCK — NEUTRAL
HOT SIDE OF LINE VIA FUSE F05 & F01
WHITE
WHITE/BLACK

Section 6 Dispense and low temperature lock-out circuit

No dispense functions : no green ready light(s)

Power on lamp is **OFF**

- Check if yellow LED on microprocessor board is on. If on, continue. It not see Power Pack section.
- Check for 24 VDC at base board BU-04, pin 12(+) & 3(-). If 24VDC is OK, continue. If not, **see No dispense**
- Check if all wires are secure where soldered to relay board. If not, repair or replace relay board.
- Check for 24VDC at relay board BU-04A, pin12(+) & 3(-). If 24VDC is OK, continue, if not, replace relay board.
- Check for 24VDC at harness plug BU-FP, pin 12(+) & 3(-) If 24VDC is not OK, check connections at plug BU-FP & BU04A
- Check all connections at the front panel switches, lamps and LEd display board.

Power on lamp is **ON**

Dispense **OK**

- Check BOTH portion sizes for proper dispense.

Both sizes are **OK**

- Check for 24VDC at BU-FP, pin 5(+) & 3(-). If 24VDC is OK, replace LED display board.
- If 24VDC is not OK, check BU-04A, pin 5(+) and 3(-).If not OK, check connections at BU-FP and BU-04A.
- If connections are OK, replace Relay board.

One size is **OK**

- Check the connections at the select switch. Check select switch for continuity in both directions. Replace if defective.
- If select switch is OK, replace LED display board.

NO Dispense

- Check adjustment of lock-out thermostat. **See lock-out circuit theory.**
- Turn lock-out thermostat all the way down. If green light does not come on, disconnect wiring from thermostat. If lights come on, replace thermostat.
- Check all connections to the relay board, display board and front panel switches. If all OK, replace relay board.

No dispense functions : Green ready light(s) are on

Both LED's on MP board are **ON**

- Check mechanical operation of the Relay board as outlined in **note 1**.
- In general, if any of the relays do not function correctly, check all wiring between relay board & front panel switches and relay board & base circuit board.
- If the large and small relays are both inoperative, check the start switch and front panel wiring. If just 1 relay operates, check the select switch and wiring.
- If either green ready indicator is lit, then there is no problem with the lock-out relay. For lock-out relay problems, see N**o green ready lights.**

CAUTION
The following steps may cause the dispenser to dispense hot coffee.

- Jumper Bu-04 pin 3 & 4. If the small portion size dispenses with the jumper, replace the Relay board. If there is no dispense, replace the microprocessor.
- Jumper Bu-04 pin 3 & 10. If the large portion size dispenses with the jumper, replace the Relay board. If there is no dispense, replace the microprocessor.

Note 2

Reference to Microprocessor board LED indicator lights.
The green LED on the microprocessor board indicates approx. 13 VDC. the yellow LED on the microprocessor board approx. 24 VDC. The voltage checks must be taken with a meter to verify that they are correct.

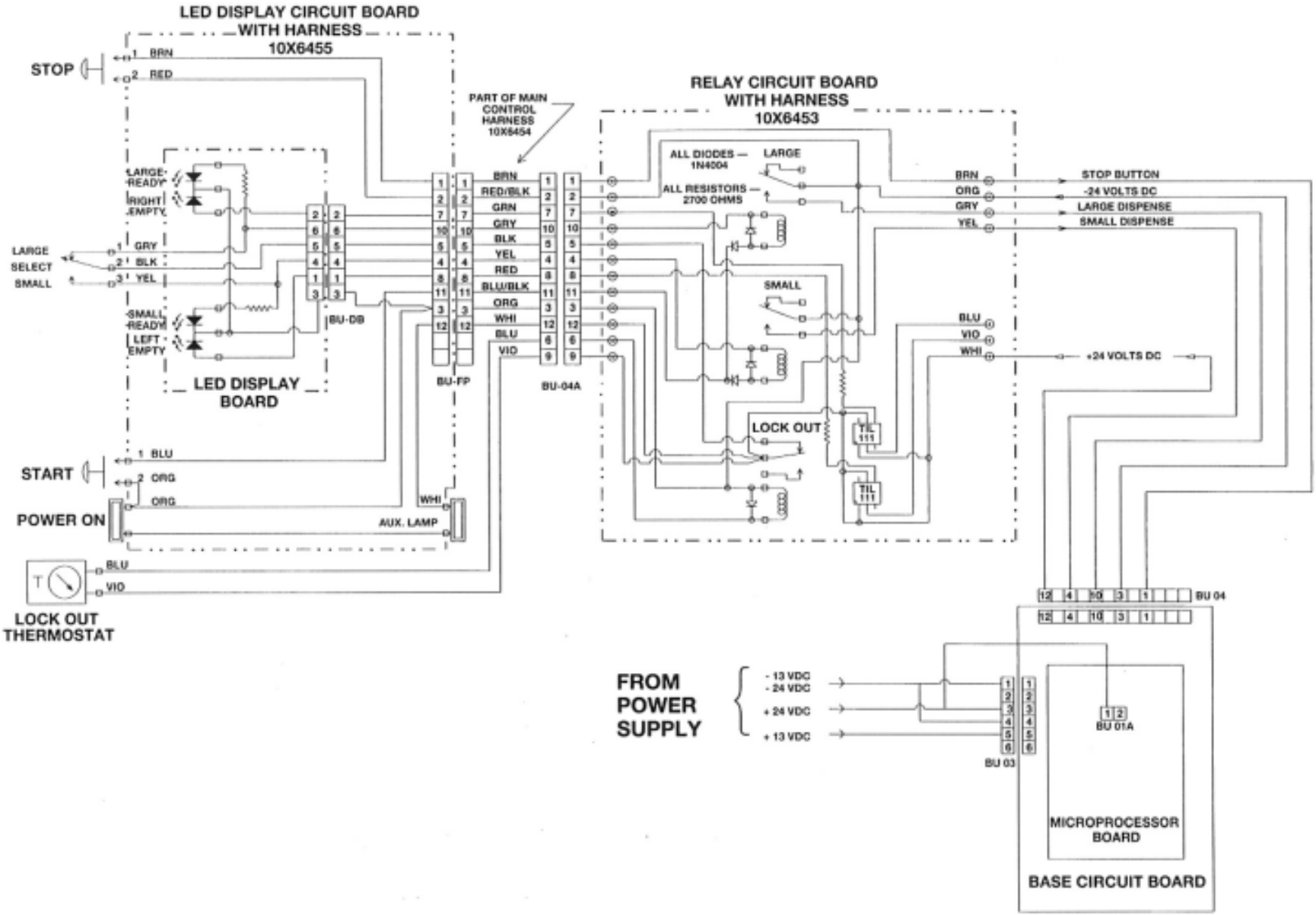
One or both LED's are **OFF**

- Make sure that the microprocessor and all connecting plugs are firmly seated in their sockets.
- Refer to the Power Pack section and ferform all the suggested voltage checks according to which LED is out. **See note 2.**
- If all voltages are OK, check the resistance of both water coils and both concentrate coils. Water coils are 12~15 Ohms, concentrate coils are 0.95 Ohms.
- If all coils check OK, replace the microprocessor and check the LED's.
- If one or both LED's are still out, replace the base circuit board.

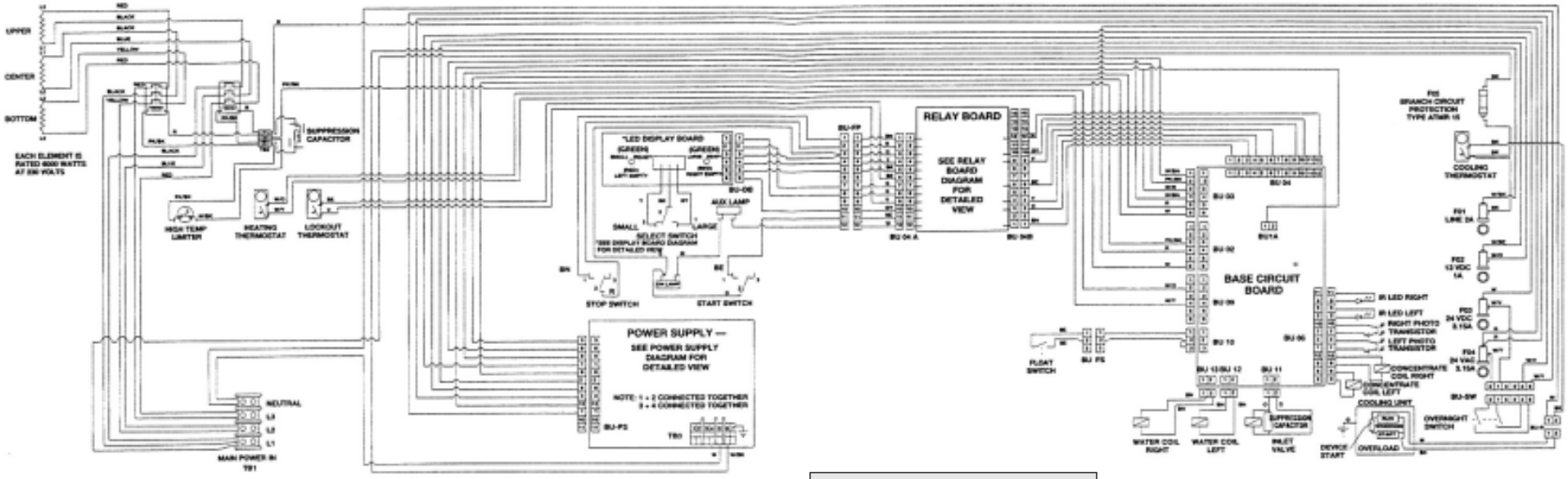
Note 1

Observe the action of the 3 relays on the relay board. The power ON light must be on.
Turning the lock-out thermostat **higher** than the tank temperature should energize the lock-out relay. Turning it **lower** will release the relay. (Relay must be released in order to allow dispense function.)
With the select switch in the SMALL position, pressing the start switch should energize the small relay. With the select switch in the LARGE position, pressing the start switch should energize the Larger relay.
The stop switch causes no visible action on the relay board.

Front panel and Relay board schematic



Wiring diagram



Color code:

W =	White
BK =	Black
BE =	Blue
BN =	Brown
Y =	Yellow
O =	Orange
V =	Violet
R =	Red
G =	Green
PK =	Pink
GY =	Grey

Multi color wires
Main color/Tracer Color

F =	Fuse
BU =	Connecting plug